USDA Forest Service
Chattahoochee-Oconee National Forests

Environmental Assessment

Non-native Invasive Species Treatment

Blue Ridge and Conasauga Ranger Districts
Catoosa, Chattooga, Dawson, Floyd, Fannin, Gordon, Gilmer, Lumpkin, Murray, Towns, Union, Walker, Whitfield Counties

October 2008

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

This environmental assessment (EA) displays the environmental consequences of actions proposed by the United States Department of Agriculture (USDA), Forest Service, to reduce or eliminate impacts from Non-native Invasive Species (NNIS) populations on the Conasauga (CRD) and Blue Ridge Ranger Districts (BRRD) of the Chattahoochee-Oconee National Forests in Georgia.

This project is designed as an adaptive management approach to control NNIS across the approximately 172,297 acres of the Conasauga District and the approximately 301,867 acres of the Blue Ridge District. A vicinity map is shown in Figure 1.

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for federal actions having the potential to impact the quality of the human environment; the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) 1500 through 1508) for implementing NEPA; Forest Service Procedures for Implementing CEQ regulations (Forest Service Manual (FSM) Chapter 1950); and the Forest Service Policy and Procedures Handbook (Forest Service Handbook (FSH) 1909.15).

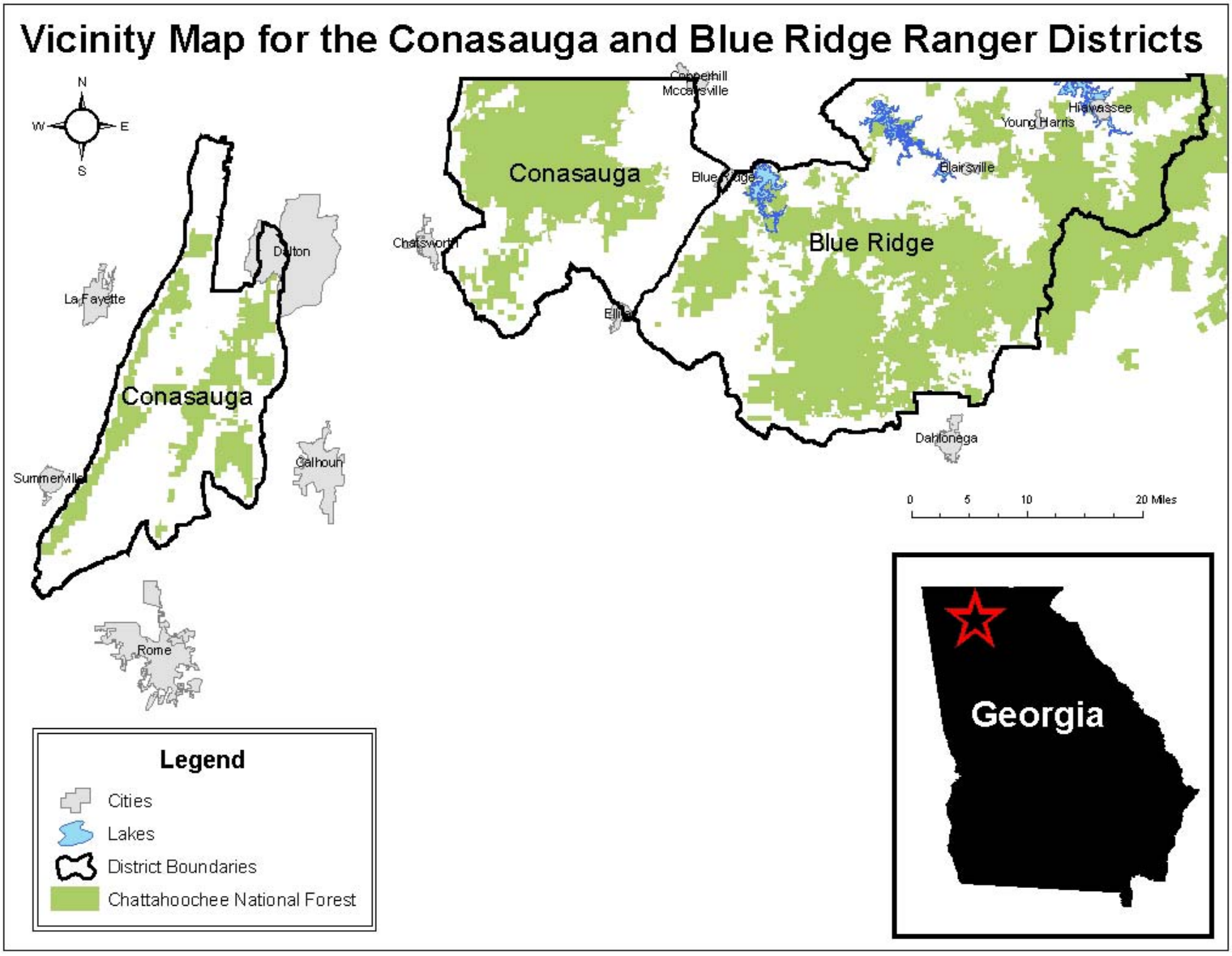
1.2 Purpose and Need

NNIS are rapidly spreading through the natural habitats across the Districts, displacing native plants, and disrupting natural ecosystem processes. The purpose of the proposal is to reduce or eliminate impacts from NNIS populations in order to protect the integrity of natural plant communities.

The purpose and need for this proposal is supported by direction provided in the Forests' Land and Resource Management Plan under Goal 12 which states, "Minimize adverse effects of invasive native and non-native species. Control such where feasible and necessary to protect national forest resources" (Forest Plan, p 2-8).

The purpose and need for this project is consistent with Southern Regional Strategy for the Prevention, Control, and Eradication of NNIS (USDA Forest Service 2005). This project also addresses one of the four major threats defined by the Chief of the Forest Service, which is the spread of invasive species, and addresses Executive Order 13112 that directs all federal agencies to detect and respond rapidly to control NNIS populations.

Figure 1. Vicinity Map



1.3 Proposed Action

The proposed action includes treatment of NNIS across the CRD and BRRD using a combination of manual, cultural and chemical control methods through an adaptive management approach. Known infestations sites would be treated based on priority.

The priority system would be implemented to ensure that the NNIS populations that pose the greatest threat to biodiversity and native plant communities would be treated before others that pose less risk.

Although known priority sites will be treated initially, the intent of this proposal is to incorporate an adaptive management strategy, allowing for treatment of new locations of NNIS, treatment of newly recognized NNIS and use of new herbicides. A more detailed description of the proposed action is found in Chapter 2.

1.4 Decision to be Made

The responsible officials for the decision will be the District Ranger for the Conasauga Ranger District and the District Ranger for the Blue Ridge Ranger District, Chattahoochee-Oconee National Forests. The responsible officials will answer the following three questions based on the environmental analysis:

1. Will the proposed action proceed as proposed or not at all?

2. If it proceeds, what mitigation measures and monitoring requirements will be implemented?

3. Will the project require an Environmental Impact Statement (EIS)?

1.5 Scoping

Staff on the districts gathered known locations of invasive species infestations in 2007 and early 2008. On February 4, 2008, a pre-scoping meeting was held to gather internal concerns. Attendees included Cindy Wentworth (Forest Botanist), Jim Wentworth (Wildlife Biologist, Blue Ridge RD), Ruth Stokes (Wildlife Biologist, Conasauga RD), and Rachelle Powell (Wildlife Biologist Trainee, Blue Ridge RD). A public involvement letter was composed and sent out to individuals, groups, and other agencies on May 2, 2008. This letter was sent out to 176 entities (see project file). Ten responses were received during this scoping period, and are in the project file.

1.6 Issues

Issues are used to formulate alternatives, prescribe mitigation measures, and to define the scope of the environmental analysis. Each response from scoping was reviewed in order

to identify issues. Issues that would drive the development of an alternative are referred to as a significant issue. No significant issues were identified for this project. The results of this process are displayed in Appendix 1.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter describes and compares the alternatives considered for this NNIS treatment project. It includes a description of the alternatives considered but eliminated from detailed study and alternatives considered in detail. No significant issues were identified through the scoping process. The only alternatives considered in detail are the proposed action and the no action alternatives.

This chapter also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker.

2.2 Alternatives Considered but Eliminated from Detailed Study

An alternative that would treat NNIS without the use of herbicides was considered but eliminated from detailed study. This would mean that the Districts would treat NNIS through the use of fire, hand control, or mechanical controls only.

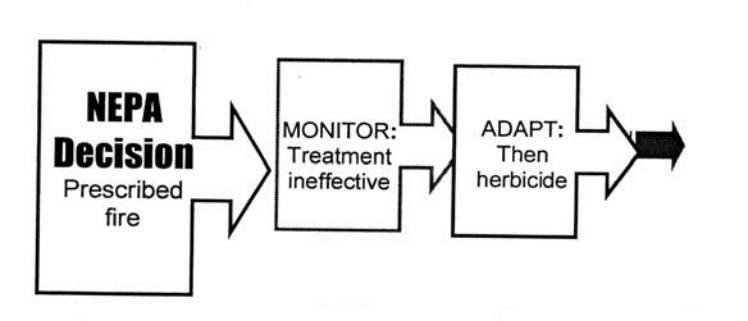
NNIS plants have a number of biological characteristics which render them difficult to control with cultural or mechanical controls alone. Many exhibit rapid growth rates, lack natural predators, are very good competitors, and produce abundant and early seed. Most NNIS plants are perennials, with extensive tough runners or roots which readily resprout after cutting. Mechanical and cultural controls do not control the roots. Based on this, it would be impractical to rely only on cultural and mechanical means of control of NNIS. Therefore, this alternative was eliminated from detailed study.

2.3 Alternatives Studied in Detail

2.3.1 Proposed Action

The proposed action would implement an adaptive management approach to control and eradicate NNIS. The use of an adaptive management strategy (Figure 2) would allow the Forest Service to anticipate changes in the species (i.e. infestations of new species) and the best methods for their control (i.e. new chemicals) as they change and evolve. This alternative recognizes that NNIS infestations constantly change and evolve, making it difficult to keep treatments current. It is certain that not all infestations can and will be mapped and limiting treatment to known locations and species of NNIS does not allow for changes over time. Considerable time would be necessary to complete analysis of additional populations and species. These species could expand during this waiting period, and the opportunity of containing these populations could be lost.

Figure 2. Adaptive Management Example



The NNIS that would be treated using this adaptive management approach are found in the following table:

Table 1: Known NNIS on the Conasauga and Blue Ridge Ranger Districts

Scientific Name	Common Name
Ailanthus altissima	Tree of heaven
Albizia julibrissin	Mimosa; Silktree
Arctium minus	Common burdock
Carduus nutans	Musk thistle; Nodding plumeless thistle
Celastrus orbiculatus	Oriental bittersweet
Cirsium vulgare	Bull thistle
Dioscorea oppositifolia	Chinese yam
Elaeagnus umbellata	Autumn olive
Hedera helix	English ivy
Lespedeza cuneata	Sericea lespedeza
Ligustrum sinense	Chinese privet
Lolium arundinaceum *	Tall fescue
Lonicera japonica	Japanese honeysuckle
Microstegium vimineum	Japanese stiltgrass; Nepal grass
Miscanthus sinensis	Chinese silvergrass
Paulownia tomentosa	Princess tree
Polygonum cuspidatum	Japanese knotweed
Pueraria lobata	Kudzu
Rosa multiflora	Multiflora rose
Spiraea japonica	Japanese spirea; Japanese meadowsweet
Sorghum halepense	Johnson grass
Vinca minor	Small periwinkle
Wisteria sinense	Chinese wisteria

* - applies only to endophyte-enhanced cultivars, (e.g. KY 31 tall fescue)

All NNIS populations are a concern across the Districts, but a priority system is needed to ensure that the NNIS populations that pose the greatest threat to biodiversity and native plant communities are highlighted. The priority for treatment would be based on the impact to the biodiversity in the area combined with a priority for the rapid response to

new species detected on the two ranger districts. In addition, the location of the infestation would be prioritized. The following describes the order of priorities when considering treating NNIS across the Ranger Districts.

- NNIS infestations which threaten federally listed, Regional Forester's sensitive, or locally rare species (see Forest Plan, p 2-13, FW-032)

- NNIS infestations of species that are early in their colonization of the Districts and are considered highly aggressive in spread and impacts to native plants. These species are considered to have a high I-rank. For example, Japanese knotweed is highly aggressive and only known on 2 locations across the Forest. These populations would be a high priority for treatment.

- NNIS infestations which are within or adjacent to the following Management Prescriptions (MP) will receive higher priority than other areas:

    - Rare communities (MP 9.F)
    - Botanical Areas (MP 4.D)
    - Designated Wilderness Areas (MP 1.A)
    - Recommended Wilderness Study Areas (MP 1.B)
    - Appalachian Trail (AT) corridor (MP 4.A)
    - Natural Areas (MP 4.I)

- NNIS infestations in areas that serve as vectors for spread into areas without infestations and areas where new populations are likely to establish. These include areas such as riparian corridors, roadsides, trails, wildlife openings, campgrounds, boat docks, administrative building, utility corridors, and parking areas.

Any NNIS control proposal in Wilderness will be reviewed through the Minimum Requirement Decision Guide (MRDG) http://www.wilderness.net/mrdg/ to determine if the proposed actions are necessary for the Wilderness Area, or if a less intrusive method could be implemented. Depending on the method of NNIS control proposed, final approval of the action will come from the Forest Supervisor or from the Regional Forester.

Invasive plant infestations have been documented on both the CRD and BRRD and sites currently known that need treatment are listed in the Table 2 and are shown in Figures 3-5.

Table 2. Known NNIS Sites on the Conasauga and Blue Ridge Ranger Districts

Ranger District	Site	Species	Acreage
Blue Ridge	Starr Creek Road-Richard Knob	Kudzu	1.0
Blue Ridge	Lake Chatuge	Kudzu	2.0
Blue Ridge	Hwy 180 near Sosebee Cove	Kudzu	3.0
Blue Ridge	Forest Drive – Lake Nottley	Kudzu	2.0
Blue Ridge	West Skeenah Road	Oriental bittersweet	0.25

Blue Ridge	Appalachian Trail – Woody Gap	Oriental bittersweet	0.25
Blue Ridge	Sea Creek Falls trailhead	Chinese privet	0.5
Conasauga	Watson Gap	Japanese knotweed	0.25
Conasauga	Gates Chapel	Japanese knotweed	0.25
Conasauga	Mountaintown Creek	Chinese privet	0.25
Conasauga	Hurricane Creek	Chinese privet	1.0
Conasauga	Alaculsy Valley	Kudzu	0.5
Conasauga	Dyer Gap	Kudzu	0.5
Conasauga	West Cowpen Road	Kudzu	1.0
Conasauga	East Cowpen Road	Kudzu	1.0

In addition to the above list of sites that was in the project scoping letter, new sites of NNIS have been documented. In the summer of 2008, NNIS inventories were conducted in several Wilderness areas and along firelines constructed for wildfires that occurred in 2007. The predominant NNIS found in all areas was Nepal grass. Additional species found were multiflora rose, exotic lespedezas, princess tree, autumn olive, mimosa, burdock, honeysuckle, kudzu, tall fescue, privet, Japanese spirea, and musk thistle. Most of these NNIS were associated with old road beds and trails.

Figure 3. Blue Ridge Ranger District

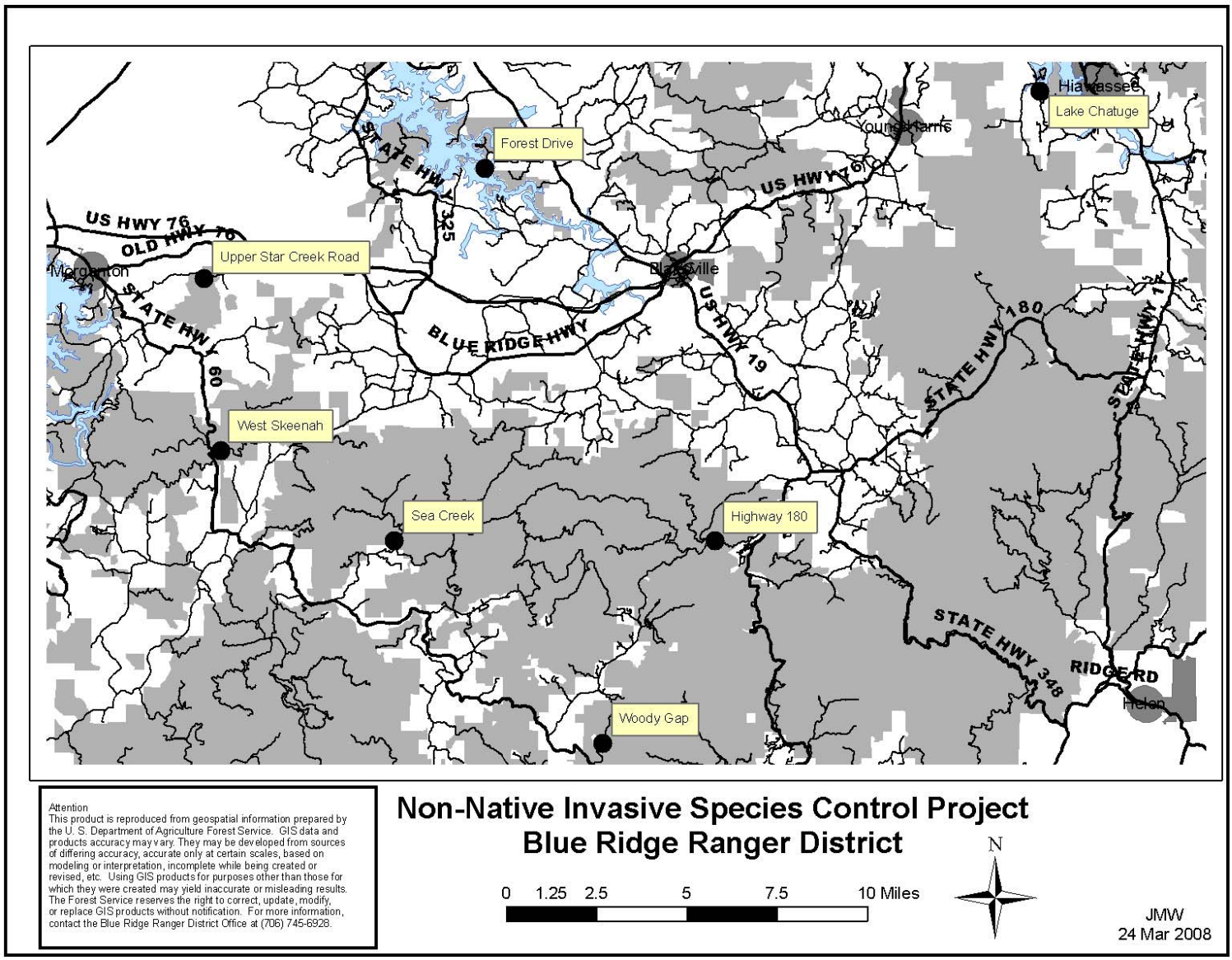


Figure 4. Conasauga Ranger District (Eastern Portion)

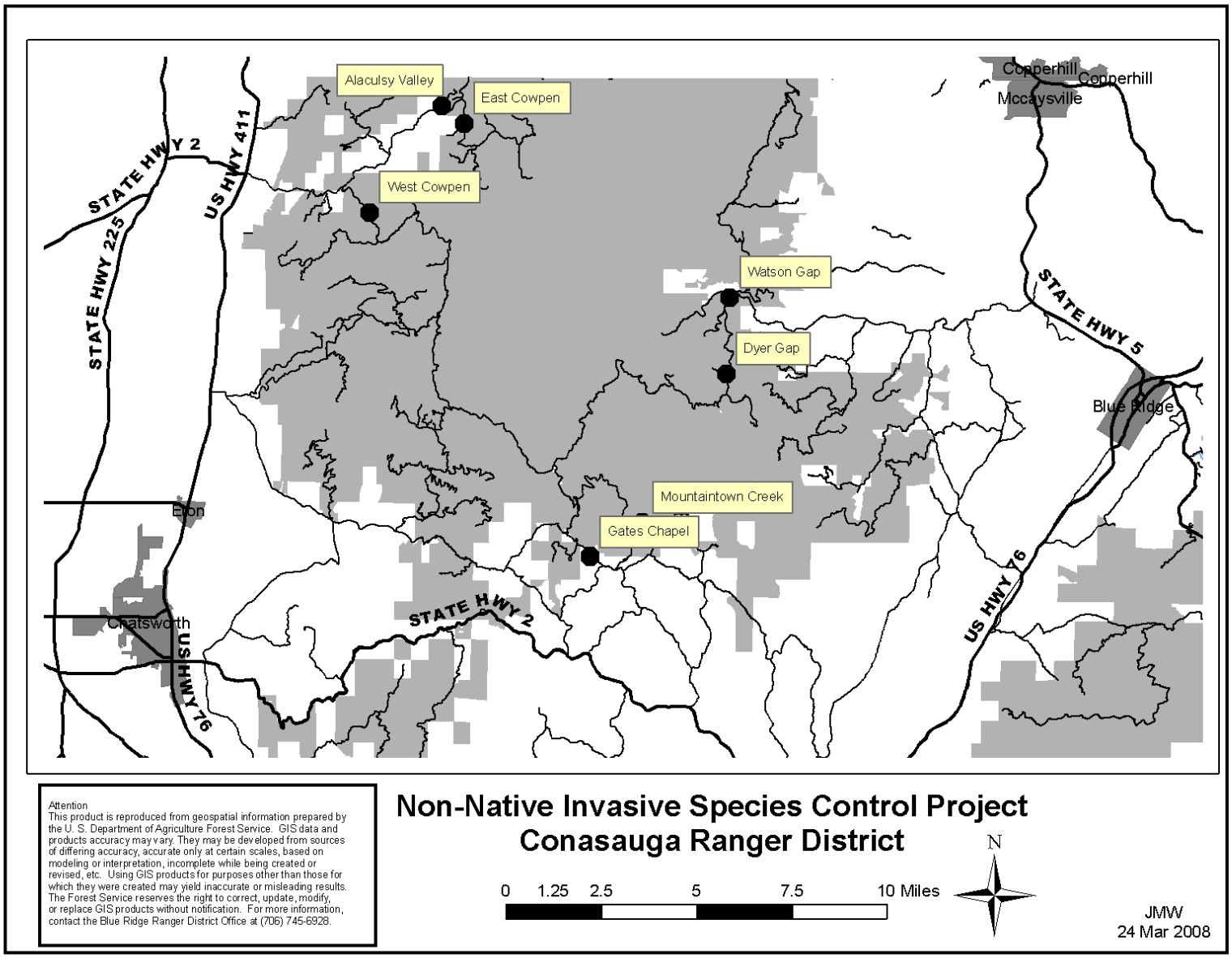
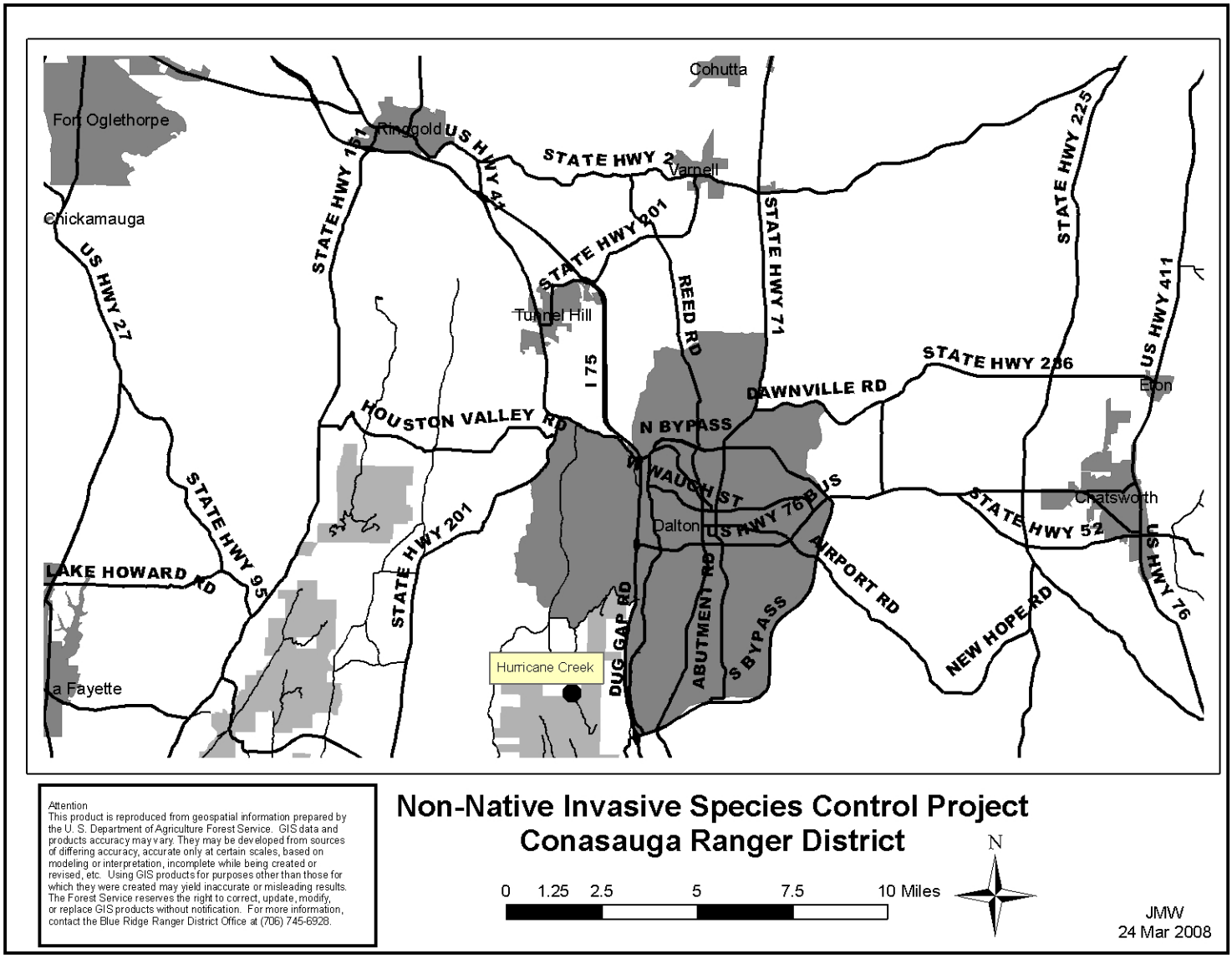


Figure 5. Conasauga Ranger District (Western Portion)



Due to the broad scale of the proposed action and its adaptive nature, additional site-specificity would be ensured through the use of an implementation checklist (Appendix 2). Prior to any treatments, management actions would be subject to additional site-specific review by Forest staff in the areas of botany/ecology, wildlife biology, aquatic biology, hydrology/soils, heritage resources and the wilderness manager (if appropriate). The use of the implementation checklist would ensure that potential environmental impacts are within the scope of the impacts predicted in this EA.

To analyze the potential environmental effects of the proposed action, a maximum annual treatment acreage of National Forest land was estimated considering the known levels of NNIS infestations including location and species, and current and anticipated funding levels. The maximums are as follows: (see Methods section below for a description of the various treatments)

- Up to 150 acres of manual or mechanical treatments
- Up to 30 acres of spot treatments using cultural methods
- Up to 350 acres of herbicide treatments

Methods

Proposed Manual and Mechanical Methods: Hand-pulling, cutting, digging, mowing, or plowing would be the principal manual methods employed. Manual methods are primarily effective for controlling small spot infestations. Examples of hand tools that might be used include shovels, saws, axes, loppers, hoes, or weed-wrenches. Other equipment could include chain saws, brush blades, mowers, and small bulldozers.

Proposed Cultural Methods: Cultural methods may include the use of fire, mulch, or other gardening techniques such as weed cloths and plastic sheeting, or propane weed torch to spot-burn specific invasive plants. The weed torch works to burn a single target plant, and is primarily used in plant communities such as bogs or areas with low potential to carry a fire. Other use of prescribed fire would be applied in accordance with approved burn plans.

Proposed Chemical (Herbicide) Methods: All LMP Forest-wide standards (FW-011 through FW-028) for herbicide use will be followed. Herbicides would be used according to manufacturer's label direction for rates, concentrations, exposure times, and application methods. Herbicides would be directly applied to the target plants. Techniques that could be used include direct foliar applications using systems mounted on trucks, tractors or all-terrain vehicles, backpack sprayers, hand-held brushes, basal bark and stem treatments using spraying or painting (wiping) methods, cut surface treatments (spraying or wiping), and woody stem injections. No herbicides would be applied aerially. Only formulations approved for aquatic-use would be applied in or within 100' of wetlands, lakes, and streams.

Specific herbicides that could be used in the project area are listed below. Detailed descriptions of these chemicals including comprehensive risk assessments for each can be found at: http://www.fs.fed.us/foresthealth/pesticide/risk.shtml

- **Glyphosate** (Accord™, Roundup™, and Rodeo™) is a non-selective, broad spectrum herbicide that can be used to control many grasses, forbs, vines, shrubs, and tree species. Specific formulations of glyphosate have been labeled for aquatic application.

- **Triclopyr** (Garlon 3A™, Garlon 4™, and Pathfinder II™) is a selective herbicide that controls many species of herbaceous and woody broadleaf weeds, but has little to no effect on grasses.

- **Clopyralid** (Transline™) is a selective herbicide that controls broadleaf herbs, primarily composites, legumes, and smartweeds.

- **Imazapic** (Plateau™) is a selective herbicide that is used primarily in and around populations of native, warm season grasses.

- **Imazapyr** (Arsenal™ and Chopper™) is a selective herbicide that is used primarily in the control of hardwood trees and some species of grasses.

- **Sethoxydim** (Poast™) is a selective post-emergence herbicide used to control annual and perennial grasses.

2.3.2 Alternative 1 (No Action)

The "no action" alternative is defined as a continuation of current management activities in the area. It serves as a comparison to the proposed action. The Proposed Action would not be implemented under this alternative. Management activities with prior approval under other environmental documents would continue to be implemented. Recreational activities such as hunting, camping, sightseeing, hiking, fishing, and mountain biking would continue. Dispersed recreational sites, trails, trailheads, and parking areas would continue to be used. Under this alternative, non-native invasive plant populations would persist and continue to spread to adjacent areas.

2.4 Mitigation Measures Common to the Proposed Action and Action Alternatives

All applicable mitigation measures will be carried out as detailed in the Forest Plan, and in Best Management Practices for Georgia. Mitigation measures for the treatments described above include the following:

- No herbicide application will be applied within 100 horizontal feet of lakes, wetlands, or perennial or intermittent springs and streams, except where aquatic-labeled herbicides are used to prevent significant environmental damage as that which could be caused by NNIS infestations (LMP Standard FW-022).

- The lowest effective herbicide rates that will meet project objectives will be used according to guidelines for protecting human and wildlife health. Application rate and work time will not exceed levels that pose an unacceptable level of risk to human or wildlife health (LMP Standard FW-012).

- Herbicide formulations and application methods have been chosen which will minimize the risk to human and wildlife health and the environment while accomplishing project objectives.

- Mitigation of bare soil where NNIS are removed will include revegetation to a minimum of 85% coverage within 30 days of completion (LMP Standards FW-067 and FW-068). An exception would be if the treatment is completed outside of the growing season, in which case revegetation would be completed within the first growing season.

- Mulch and silt fencing will be used as needed to prevent erosion.

- Herbicide mixing, loading, or cleaning areas in the field will not be located in sensitive areas or within 200 feet of private land, open water, or wells (FW-023).

- A spill plan will be in place for the Proposed Action and Action Alternatives.

- Species such as kudzu and Japanese knotweed form dense monocultures, excluding any native species, including those that are rare. But where indicated, sites proposed for herbicide or manual control would be inventoried for rare species prior to treatment.

- Where NNIS are threatening rare plants, if herbicide is the method of choice, the herbicide formulation will be used that is least likely to adversely impact the rare plant.

2.5 Monitoring for Proposed Action and Alternatives

There are 3 types of monitoring; implementation, effectiveness, and validation. Implementation and effectiveness monitoring are usually applicable at the project level. The following monitoring is proposed to be conducted under the Proposed Action and Alternatives, as applicable:

Implementation monitoring:

- Mixing of herbicides will be observed to ensure that is at the lowest effective rate to meet project objectives per FP standard FW-012
- In the vicinity of waterways, herbicide applications will have oversight to ensure compliance with FP standards FW-021 through FW-025. These standards address use of soil-active herbicides, application distance to water under various circumstances, and location of herbicide mixing areas.

- During activities inspections will be conducted to ensure implementation of BMP's for ground disturbance, prescribed burning activities and herbicide application, as appropriate.

Effectiveness monitoring:

- Condition of the target vegetation will be observed to ensure it was controlled/eradicated as a result of the treatment of choice. This information will indicate whether or not additional treatments are necessary.

- Non-target vegetation in the vicinity of the treatment will be assessed to determine if there are any adverse impacts to the non-targeted plants as a result of the treatment.

- Areas of ground disturbance will be monitored to ensure water control structures (silt fencing, hay bales, road dips, surge stone, etc.) are present and effective.

- After seeding and/or mulching of areas of ground-disturbance, sites will be monitored to ensure 85% of the site is covered within 30 days of the ground-disturbing activity. Prompt measures will be taken to correct the situation if this level of cover is not present.

2.6 Comparison of Alternatives

Table 3 compares the alternatives in terms of their ability to meet the purpose and need.

Table 3: Comparison of Alternatives

Project Objectives	Proposed Action	No Action Alternative
Does alternative reduce or eliminate impacts from NNIS populations in order to protect the integrity of natural plant communities?	Yes	No
Does alternative allow treatment of NNIS plants to prevent their spread and protect the integrity of natural resources?	Yes	No
Does alternative provide an avenue for protecting Threatened, Endangered and Sensitive species and rare communities from NNIS?	Yes	No
Does alternative provide the opportunity to treat new infestations in a timely manner while they are in their initial colonization status?	Yes	No

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter describes the direct, indirect, and cumulative environmental effects, including the effectiveness of mitigation measures, which would result from implementing the Proposed Action and the alternatives to the Proposed Action.

3.2 Physical

3.2.1 Water, Soil, Riparian Resources, Wetlands, Floodplains

Current Situation

Extensive background information on these physical resources can be found in the Final Environmental Impact Statement for the Forest Plan (Forest Plan FEIS), pages 3-3 to 3-80.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects

The no action alternative would result in a continuation of existing conditions within the analysis area. There would be no control of NNIS, which would continue to spread. No direct effects to the soil and water resources would result from implementing this alternative. Indirect effects of the presence and potential increase in abundance of NNIS include the displacement of native species within the riparian areas, wetlands, and floodplains. This displacement negatively affects native biodiversity (both flora and fauna). Examples of this include the invasion of Nepal grass into wetlands such as bogs and seeps, and the invasion of Japanese honeysuckle into riparian areas where native cane formerly dominated. By changing the species composition and vegetative structure of these habitats, soil and water resources, riparian areas, wetlands, and floodplains and their associated biodiversity would be negatively affected.

Cumulative Effects

Management activities on National Forest System Lands which could potentially affect soils, water, riparian resources, wetlands, and floodplains within the analysis area include timber harvest, prescribed burning, road and trail maintenance, wildlife and fisheries habitat improvement projects, and other vegetation management activities. These activities are widely scattered across the Forest and mitigation measures are applied to all actions to minimize effects to the soil and water resources. Herbicides have been used to a minimal degree in recent years in silvicultural programs and in administrative sites such as campgrounds. On private land within the analysis area, development is ongoing, with varying degrees of compliance with Georgia BMPs and a variety of outcomes to soil and water.

Implementation of Alternative 1 in combination with past, present, or reasonably foreseeable actions would have no cumulative effects on the soil and water resources.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects

Manual methods: Hand-pulling, cutting, digging
Manual methods of removal will be used for small spot infestations. Minimal ground disturbance would result from manual removal methods, therefore the effects to soil, water, riparian resources, wetlands, and floodplains are negligible.

Mechanical methods: Mowing, plowing
Mowing does not expose soils or result in erosion or sedimentation. Plowing can result in erosion and sedimentation if soils are exposed for long periods of time or prior to precipitation, however, adverse effects from this method are likely to be minor due to prompt re-vegetation. Neither of these methods is likely to be used to treat infestations in riparian areas, wetlands, or floodplains.

Cultural methods: Prescribed fire, propane weed torch, gardening methods such as mulching, use of plastic sheeting, or weed cloths
Prescribed burning does not normally expose soils or result in erosion and sedimentation. Research has shown that low-intensity burning does not affect ground water or surface water chemistry (Elliot and Vose 2005, Douglas and Van Lear 1983). Only a small amount of duff (organic layer) would be consumed, leaving most of the organic layer intact, protecting soils. The potential for erosion would be associated with constructed firelines. Properly constructed firelines and application of mitigation measures (such as water diversion structures and prompt re-vegetation) would minimize erosion potential from this source. Whenever possible, roads, trails, and natural features would be utilized as firelines. Individual burn plans would be prepared for each area.

The weed torch targets individual plants, and is primarily used in plant communities such as bogs or areas with low potential to carry a fire. Gardening methods such as mulching or use of weed cloths function by smothering or eliminating light exposure to the target plants. These cultural methods do not expose soils or result in erosion or sedimentation.

Chemical methods: direct foliar application, cut stem/injection, basal bark treatments
The amount, type of herbicide, and the method of application influence the effects of herbicide on soil, water, riparian resources, wetlands, and floodplains. The potential **direct** effects of the treatments proposed include:

- Contamination of soil, water, riparian areas, wetlands, or floodplains by drift of fine mists during foliar applications, or movement of chemicals with water or soil particles
- Reduction of targeted or non-targeted vegetation, resulting in erosion or sedimentation.

Several factors are important to consider related to the potential for direct effects to soils, surface or ground water, riparian resources, wetlands, and floodplains:

1. **Buffer zones.** Mitigations such as streamside buffer zones where herbicides are prohibited greatly reduce contamination potential. Buffer zones of 50 feet have been found to be effective in minimizing contamination of streams (Neary and Michael 1996).

Forest Plan direction includes a minimum 100 foot riparian corridor on each side of the stream channel of all perennial and intermittent streams and other bodies of water. Only the aquatic formulation of glyphosate (a chemical that does not persist in wet environments and has minimal harmful effects to aquatic ecosystems) would be used to treat NNIS within the riparian corridor. Similar protection (buffer zones) applies regarding transporting, mixing, and disposal of herbicides.

2. **Type and amount of chemical.** The small amount of herbicide needed (generally a pint or less per acre) to effectively control NNIS greatly reduces contamination potential. Relatively small amounts of chemicals which are low in toxicity and relatively short-lived in the environment would be used to treat NNIS in this proposed action. A risk assessment for each herbicide proposed for use was completed using methodology developed for the Forest Service by Syracuse Environmental Research Associates (SERA). The details of the risk assessment results are available in the project record. For each herbicide, hazard quotients (HQs) were developed summarizing risk to aquatic species. Some of the analyzed herbicides at the standard application rates have a HQ of greater than 1.0, but only in cases of accidental spills into small bodies of water, which is extremely unlikely. The effect of dilution of small amounts of low-toxicity herbicide in surface or ground water resources would further minimize potential hazards. When applied at the lowest effective rates, herbicides are unlikely to seep into groundwater due to their characteristic low soil mobility.

3. **Application method.** The method of application (generally foliar treatments) greatly reduces herbicide contact with the soil and reduces the potential for non-target application or drift to surface water. All of the chemical treatments would be directly applied to targeted vegetation. Details regarding application may be found in Effects to Vegetation section of this EA. Very little herbicide would make contact with the ground. Infiltration into the soil and subsurface water would be minimal. The greatest hazard to soils, surface water, and ground water quality would result from an accidental spill during transportation or mixing of the herbicides.

4. **Timing.** Timing the herbicide application to avoid rainfall during and immediately after application reduces the risk of contamination. The amount of herbicide that can potentially enter the stream system through storm runoff is dependent on the concentration of herbicide applied, the time since application, and the intensity and duration of precipitation. Weather conditions would be carefully considered before herbicide application to reduce the possibility of run-off or drift into the riparian corridor or surface water. Care will be taken to apply herbicides during times when the probability of precipitation is small, and a 100-ft buffer will be used in application of herbicides that can negatively affect aquatic environments.

Potential **indirect** effects of this proposed action include:

- Improvement of streambank stability, overall water quality, and aquatic habitat in some cases through the establishment of a more natural plant community. Some invasive species have sparse root mass, and are detrimental to stream bank stability. For instance, stream banks covered with kudzu appear stable because

they are covered with vegetation. However, kudzu provides virtually no subsurface root structure, making banks more susceptible to erosion and slumping.

Due to the dispersed extent of the areas, the type of chemicals, small amounts necessary, and the short-lived nature of the chemicals proposed for use, the direct effects should be temporary and minor if mitigation measures are applied. Prompt re-vegetation would provide effective erosion and sediment control. The positive indirect effect would increase over time.

All sites proposed for treatment would be evaluated by Forest staff in the area of soils/hydrology prior to treatment in conjunction with the use of the implementation checklist (Appendix 2). This checklist will ensure that a site-specific review has been conducted and that the potential environmental effects are within the scope of that predicted by this Environmental Assessment.

Cumulative Effects

Since most of the treatments are to treat local infestations of plants and there is little surface disturbance associated with these activities, these treatments would add very little to the ongoing effects to soil and water resources from other past, ongoing, or future actions. In addition, these chemicals are all relatively short-lived in the environment and thus will not persist on-site between treatments. If mitigation measures and BMPs are followed, these activities will have no cumulative effects on long-term soil productivity, water quality, riparian resources, wetlands, or floodplains.

3.2.2 Heritage Resources

Current Situation

Information on the general affected environment for heritage resources can be found in the Forest Plan FEIS, pages 3-525 to 3-529.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects

This alternative would have no direct or indirect effects on cultural resources.

Cumulative Effects

There are no known cumulative effects under this alternative.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects

All sites proposed for treatment involving ground disturbance would be evaluated by the Forest Archaeologist prior to treatment in conjunction with the use of the implementation checklist (Appendix 2). This checklist will ensure that sites that have potential for eligibility for inclusion in the National Register of Historic Places (NRHP) would be protected.

Cumulative Effects

There are no known cumulative effects under this alternative.

3.2.3 Wilderness/Wild and Scenic Rivers

Current Situation

NNIS surveys have been conducted at likely locations within Wilderness areas on the BRRD and CRD, such as Wilderness trailheads, along trails, old house sites, and abandoned wildlife openings throughout the Cohutta, Brasstown, Blood Mountain, Rich Mountain, Raven Cliffs, Mark Trail, and Tray Mountain Wilderness areas. Generally, infestations of NNIS are concentrated along trails and in sites where evidence of human use is the most recent. The most commonly occurring NNIS species include Nepal grass, sericea lespedeza, and paulownia or princesstree, most of which are common throughout the CRD and BRRD. One occurrence of Oriental bittersweet was documented in Blood Mountain Wilderness; this species has a high "I-rank", which indicates it is highly aggressive in spread and impacts to native plants. Status of NNIS within recommended Wilderness areas and recommended Wild and Scenic River segments are unknown, but the probability of infestations along those areas is high.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects

The no-action alternative would result in a continuation of existing conditions within the analysis area. There would be no control of NNIS, which would continue to spread. No direct effects to the wilderness or wild and scenic river resources would result from implementing this alternative. Indirect effects include the potential negative effect of increased visibility of NNIS in wilderness areas.

Cumulative Effects

There are no known cumulative effects under this alternative.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects

The decision to take action to control NNIS in Wilderness areas would be assessed utilizing the Minimum Requirements Decision Guide (MRDG) in order to determine what treatments, if any, could be implemented with the least impact on the wilderness resource. The MRDG is a process to identify, analyze, and select management actions that are the minimum necessary for wilderness administration. If it is determined by the MRDG that action to control NNIS is necessary, the "minimum tool" or treatment type which would cause the least adverse effect to the wilderness resource and character would be selected. Final approval of the action would come from the Forest Supervisor or Regional Forester, depending on the method of control proposed.

Direct and indirect effects of the various treatments would be similar to those on the Forest in general. Manual or cultural treatments would be utilized whenever possible. These treatments would be unlikely to result in adverse effects to the Wilderness resource or character. Chemical treatments (foliar) on NNIS would cause plants to wilt, turn red/brown, and eventually lose leaves. Basal treatments would cause a similar appearance during the growing season, or a lack of leaves if treated at the end of the growing season or in the winter/early spring. These treatments may cause slight contrast for the viewer immediately after the action, but impacts to Wilderness resource and character would be minor.

All sites proposed for treatment in designated Wilderness areas would be evaluated by the district Wilderness manager prior to treatment in conjunction with the use of the implementation checklist (Appendix 2).

Cumulative Effects

There are no known cumulative effects under this alternative.

3.3 Biological Environment

3.3.1 Vegetation

Current Situation

Major forest communities, rare communities, and other terrestrial habitats such as successional forests, old growth, permanent openings, and riparian corridors found on the Blue Ridge and Conasauga Ranger Districts are described in Forest Plan FEIS on pages 3-99 to 3-233. NNIS could occur in all of these habitats but more commonly occur in disturbed areas (both natural and man-made) and areas with concentrated human activity. These include roadsides, trails, wildlife openings, campgrounds, boat docks, administrative sites, parking areas, and forest communities adjacent to these disturbances. NNIS also commonly are found in riparian areas. The majority of the currently identified NNIS populations on the Blue Ridge and Conasauga Ranger Districts are located along roads and trails.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects

Since no activities will occur under the No Action Alternative, existing populations of NNIS will continue to persist and spread into new areas. NNIS would continue to invade and exploit areas of both natural and human disturbance. Natural events such as windthrow and disease and insect outbreaks would continue to promote the spread of NNIS by providing disturbing the seedbed and creating canopy gaps that increase the sunlight that reaches the forest floor. Some species such as mimosa, autumn olive, bittersweet, English ivy, Nepal grass, and privet have some degree of shade tolerance and can survive and spread without canopy disturbance. NNIS infestations will continue to displace native species and degrade natural habitats, leading to a decrease in biodiversity. Because they are small in extent and limited in distribution, rare communities could be especially susceptible to degradation.

Cumulative Effects

Populations of non-native invasive species would continue to grow and spread. Impacts of non-native invasive species on native plant diversity would continue to increase. Non-native invasive species would occupy an increasing proportion of the terrestrial ecosystems throughout the Blue Ridge and Conasauga Ranger Districts. No efforts would be made to control these plants on National Forest land. Non-native invasive plant populations would also grow onto the lands of adjacent landowners in the future and continue to impact native vegetation diversity, fire regimes, nutrient cycling, and natural hydrology. The cumulative effects of the no action would result in negative impacts to forest vegetation.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects

Treatments would occur on up to 530 acres per year using a combination of manual, mechanical, cultural, and chemical methods under the this Alternative. The proposed treatments will reduce or eliminate the targeted NNIS from the treatment sites and prevent their spread to other areas. Priority would be given to those infestations that threaten federally listed, Sensitive, or locally rare species, infestations of highly aggressive species that are early in their colonization, infestations in or adjacent to rare communities, botanical areas, Wilderness and Wilderness study areas, Appalachian Trail corridor or Natural Areas, or in areas of concentrated human activity that serve as vectors for spread. This would promote the development of native vegetation, resulting in an increase of native plant diversity.

With manual treatment methods, impacts to non-target species should be minimal, primarily involving the minor trampling of adjacent native vegetation. Where mechanized equipment such as farm tractors or mowers is used, some inadvertent impacts to adjacent non-target vegetation would be expected. There would be minimal impacts to non-target vegetation from the proposed cultural treatments. Most of the

proposed cultural treatments such as the use of weed cloth, mulch, or propane weed torches would be used to control relatively small areas of NNIS, reducing the risk to non-target plants. Prescribed burning would affect larger areas and some non-target vegetation could be impacted by the burning. However, prescribed burning plans will be designed (including factors such as the timing and intensity of the burn) to maximize the control of NNIS and minimize non-target impacts. In the long-term, by controlling NNIS and releasing native species from competition, native plants should benefit from these burns.

The chemicals proposed for use target the photosynthetic mechanism of plants, and are likely to result in the mortality of plants with which they come into contact. Because the foliar spray applications would be direct foliar spray using backpack sprayers with wands, or direct cut-stem/basal spray application, non-target species immediately adjacent to target plants should be minimally affected. Glyphosate, sethoxydim, and triclopyr have essentially no soil activity and are not mobile in the environment. Imazapyr, imazapic, and clopyralid are soil active herbicides, so impacts to non-target plants are more likely. Some non-target plants intermingled with invasive plants would be affected especially by the foliar application methods.

A complete summary of results of the risk assessment is included in the project folder. The results of theses assessments indicate that there are no risks to non-target vegetation from runoff from the application of glyphosate or triclopyr amine at the expected application rates under any conditions. Hazard quotients for exposure of sensitive terrestrial plants from runoff of imazapic and sethoxydim are greater than 1.0 only for areas with clay soils which receive more than 100 inches of annual rainfall. Given that the average rainfall for this portion of the Forest is 55-75 inches per year, this scenario is highly unlikely. Hazard quotients for exposure of sensitive terrestrial plants from runoff of clopyralid, triclopyr ester, imazapyr have hazard quotients greater than 1.0 for areas which receive more than 20, 25, and 15 inches of annual rainfall, respectively. These values vary depending on the average annual rainfall in a given area and the scenarios assume that rain falls every 10 days. However, all proposed herbicide applications are to be applied directly to the targeted vegetation; therefore by correctly following application procedures, impacts to non-targeted species would be minimal.

All proposed herbicide release applications are to be applied directly to the targeted vegetation. Herbicide spray equipment is designed to treat the target plants with a minimum of off target movement of airborne droplets. Spray nozzles that are used are designed to produce large droplets because smaller droplets tend to remain airborne and may drift with air currents away from the target vegetation. Hand application equipment used for basal spray or cut-stem techniques do not produce spray but rather a directed stream of the herbicide. Thus, these techniques do not produce herbicide drift. Well directed ground applications conducted under conditions that do not favor off-site drift will probably have no impact on off-site plant species. Therefore by correctly following application procedures, impacts to non-targeted species would be minimal.

The control of NNIS in wildlife openings will use a low boom application of glyphosate, imazapic, or sethoxydim. The risk assessments indicate that there is little risk to non-target vegetation for drift exposure from a low boom application of these 3 herbicides. This type of application would be used to improve existing wildlife fields by spraying of NNIS such as fescue and Johnson grass and replanting with other more desirable species. The effects of the direct spray on the NNIS are the desired outcome of this treatment. Imazapic will primarily be use areas where the establishment native warm season grasses are desired. Native warm season grasses are tolerant of imazapic and therefore will not be affected Mitigation measures will ensure that direct spray of non-target vegetation will be minimized. This includes a standard that prohibits herbicide application within 60 feet of any known threatened, endangered, or sensitive plant.

Cumulative Effects

Cumulative impacts consider other vegetative manipulation across the Blue Ridge and Conasauga Ranger Districts on National Forest System land as well as other ownerships. Ongoing activities on these Districts affecting forest vegetation include timber sales, pre-commercial thinning, prescribed burning, road mowing, and maintenance of existing wildlife openings. Cumulatively, these activities affect 4-6,000 acres on the 2 Districts per year, the majority as result of prescribed burning. Since the treatments for NNIS are small in size relative to the untreated forest surrounding these sites, the cumulative effects are low. A maximum of 530 acres would be treated annually which represents approximately 0.1 % of the National Forest System land on the Blue Ridge and Conasauga Ranger Districts. The NNIS treatments are selective, small in size, and directed at individual plants or woody stems. In the case of the treatment of wildlife openings, the treatments may be broadcast, but are so small as to be of negligible cumulative impact.

Repeated herbicide applications are planned, but no cumulative effects are expected since the chemicals proposed for use do not accumulate in soils or in organisms. Since the Proposed Action is likely to result in an increase in vegetation diversity within the areas targeted for non-native invasive species control, the direct, indirect, and cumulative effects on vegetation are likely to be beneficial. Non-native invasive species would generally continue to increase on private lands, where there is little financial incentive to control them.

3.3.2 Effects to Human Health and Safety

Current Situation

Currently, the use of pesticides to control non-native invasive plants on the National Forest Lands on the Conasauga and Blue Ridge Ranger Districts is very limited. On the eastern portion of the Blue Ridge Ranger District, a total of approximately 30 acres of food plots are treated each year on the Swallows Creek, Coopers Creek, Chestatee, and Blue Ridge Wildlife Management Areas by Georgia Department of Natural Resources personnel on Wildlife Management Areas (Kevin Lowery, GADNR, pers. comm.) using

glyphosate and sethoxydim. In 2008, USFS personnel treated approximately 15 acres of fescue fields with glyphosate to establish native warm season grasses and native forbs. Small quantities of herbicides (glyphosate) are used in developed recreation areas to control poison ivy and other unwanted vegetation.

In portions of the Blue Ridge Ranger District, the insecticide imydacloprid is being used for the systemic control of the hemlock woolly adelgid (HWA). In selected hemlock stands (Hemlock Conservation Areas-HCA's), up to 3 groups of 60 trees are being treated by injecting the chemical in the soil at the base of the tree. Groups of hemlocks also are being treated in developed campgrounds to protect high priority trees. Approximately 1000-1500 hemlocks are treated annually on the Blue Ridge Ranger. Chemical treatment of HWA will likely begin on the Conasauga Ranger District for the first time in fall 2008.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects

Since no activities will occur under the No Action Alternative, there will be no direct or indirect effects on human health and safety.

Cumulative Effects

Since no activities will occur under the No Action Alternative, there will be no cumulative effects on human health and safety.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects

This alternative proposes a maximum annual treatment of NNIS of 150 acres using manual or mechanical treatments, 30 acres of spot treatments using cultural methods, and 350 acres of herbicide treatments.

Manual treatments involve the use of hand tools including shovels, saws, axes, loppers, hoes, or weed-wrenches. Mechanical equipment could include chain saws, brush blades, mowers, and small bulldozers. There would be a risk of injury to workers engaged these activities, especially where mechanical equipment is involved. Proper training and the use established safety procedures are required for the use of chainsaws and heavy equipment, which will reduce the risk to workers involved in these activities. This includes the use of personal protective equipment, such as hardhats, gloves, work boots, chainsaw chaps, and eye and ear protection.

Cultural methods include the use of prescribed fire, mulch, or other gardening techniques. Prescribed burns are conducted under a specific range of fuel and weather conditions to accomplish specific objectives and minimize risk to prescribed burning personnel and the

general public. All personal involved in prescribed firing operations are fully trained and equipped with all the required personal protective equipment. Prescribed burning produces some particulate emissions which impair visibility and can have an adverse impact on human health. Burning is conducted when atmospheric conditions are most conducive to smoke dispersion, lessening the effects of particulate matter on smoke-sensitive areas. Particulate matter emissions are greatly reduced by burning under conditions that enhance flaming and reduce smoldering.

For all herbicides considered, risk analysis was completed using methodology developed for the Forest Service by Syracuse Environmental Research Associates (SERA). The details of the risk assessment results are available in the project record and additional information on this process can be found at: www.fs.fed.us/foresthealth/pesticide/risk.htm.

In the risk assessments, there are two commonly used terms are Reference Dose (RfD) and Hazard Quotient (HQ):

- **RfD** - Derived by USEPA, this is the maximum dose in mg of herbicide active ingredient per kg of body weight per day that is not expected to cause injury over a lifetime of exposure. In other words, it is, in EPA's opinion, a "safe" lifetime daily dose. This is a conservative estimate, and is designed to be protective.

- **HQ -** This is the ratio of the estimated exposure dose to the RfD. A HQ of 1 reflects an exposure to amounts of a.i. equal to the RfD; HQs less than 1 reflect exposures to amounts of a.i. less than the RfD, while HQs greater than 1 reflect exposures to amounts of a.i. greater than the RfD. *HQs of 1.0 or less reflect exposure levels that are not of concern.* HQs greater than 1.0 reflect exposures to possible effects to be examined more closely to see if the projected exposures need to be further mitigated or need to be avoided. For the effects on wildlife, one must remember that these effects are constructed for individuals and not populations.

Table 4 shows the basis for the estimated herbicide application rates. The proposed application for rates for this project are less than or equal to these standard application rates used in the SERA risk assessment workbooks. The primary sources for the application rates are Miller (2003) and Evans et al (2006).

Table 4. Herbicide Application Rate Assumptions.

Foliar Treatments					
Chemical	**Species**	**lb ai/gal**	**% fraction in Solution**	**Gal Spray/Acre**	**Lb ai/acre**
Clopyralid					
	Chinese Wisteria, Mimosa	3	0.5	5	0.08
	Kudzu	3	0.5	20	0.30
	Sericea Lespedeza	3	0.2	20	0.12
Glyphosate					

	English Ivy, Sericea Lespedeza, Tall Fescue, Nepal Grass, Japanese Knotweed, Kudzu, Japanese Spirea, Common Periwinkle, Large Periwinkle, Common Burdock, Musk Thistle, Bull Thistle, Johnson Grass, Chinese Silvergrass	4	2.0	20	1.60
	Tree of Heaven, Mimosa, Oriental Bittersweet, Japanese Honeysuckle, Princess Tree, Multiflora Rose, Chinese Wisteria	4	2.0	5	0.40
	Chinese Privet, Chinese Yam	4	4.0	10	1.60
Sethoxydim					
	Tall Fescue, Nepal Grass, Johnson Grass	1	1.5	20	0.30
Imazapic					
	Tall Fescue, Johnson Grass	2	0.5	10	0.10
Imazapyr					
	Tree of Heaven, Autumn Olive, Chinese Privet, Tall Fescue, Princess Tree, Multiflora Rose, Chinese Silvergrass	4	1.0	10	0.40
Triclopyr amine (Acid)					
	Japanese Knotweed	3	2.0	15	0.90
	Oriental Bittersweet, Princess Tree, Mimosa	3	2.0	5	0.30
	Japanese Honeysuckle, English Ivy, Chinese Yam	3	4.0	5	0.60
Triclopyr ester (BEE)					
	Oriental Bittersweet, Sericea Lespedeza, Japanese Knotweed, Kudzu, Japanese Spirea, Musk Thistle	4	2.0	10	0.80
	Tree of Heaven, Mimosa, Oriental Bittersweet, Autumn Olive, Princess Tree	4	2.0	5	0.40
	English Ivy, Japanese Honeysuckle, Chinese Yam, Common Periwinkle, Large Periwinkle, Chinese Wisteria	4	4.0	5	0.80

CUT STEMS/BASAL					
Chemical	**Species**	**lb ai/gal**	**% fraction in Solution**	**Gal Spray/Acre**	**Lb ai/acre**
Glyphosate					
cut stem/injection	Autumn Olive, Chinese Privet, Japanese Honeysuckle, Multiflora Rose	4	20.0	0.5	0.40
	Oriental Bittersweet, Japanese Knotweed, Kudzu, Japanese Spirea	4	25.0	0.5	0.50
	Tree of Heaven, Mimosa Princess Tree, Chinese Wisteria	4	50.0	0.2	0.40
Imazapyr					
cut stem/injection	Autumn Olive, Chinese Privet, Multiflora Rose	4	10.0	0.5	0.20
	Tree of Heaven, Mimosa Princess Tree, Chinese Wisteria	4	50.0	0.2	0.40

Triclopyr ester(BEE)					
basal bark	Tree of Heaven, Mimosa, Oriental Bittersweet, Autumn Olive, Chinese Privet, Princess Tree, Kudzu, Multiflora Rose, Chinese Wisteria	4	20.0	0.5	0.40
Triclopyr amine (acid)				0.00	
cut stem/injection	Tree of Heaven, Mimosa, Chinese Yam, Chinese Wisteria	3	50.0	0.2	0.30
	Oriental Bittersweet, Japanese Knotweed, Kudzu, Japanese Spirea	3	25.0	0.5	0.38
	Chinese Privet, Japanese Honeysuckle	3	20	0.5	0.30

Measures to ensure public safety are incorporated into project mitigation, contract specifications, and product labels which will be followed at all times. See pages Chapter 2 for some selected mitigation measures, and the Forest Plan, pages 2-9 through 2-11 for other related to the use of herbicides.

Contracted crews will be supervised by a certified pesticide applicator and will comply with all other state and Federal regulations regarding applicator certification, licensing and safety. Forest Service crewmembers will be trained in personal safety, proper handling and application of herbicides. All areas will be signed following herbicide application. Forest Service crews will carry additional emergency clothing, soap, wash water, eyewash bottles, and safety equipment to the field when applying herbicides. These measures are all designed to protect human health and safety.

The risk characterization for each of the herbicides is summarized below including a discussion of those scenarios where the typical exposure Hazard Quotients exceeds 1.0. A complete summary of results of the risk assessment is included in the project folder.

Glyphosate

For both workers and members of the general public there is very little indication of any potential risk at the typical application rate of 2 lbs a.i./acre. (see risk assessment for Glyphosate, page xvi -SERA 2003a). All proposed application rates are less than 2 lb/acre. All typical exposure Hazard Quotients for workers and the general public are less than 1.0 for glyphosate, therefore application of this chemical is not likely to affect human health and safety.

Triclopyr

There is no indication that workers will be subject to hazardous levels of triclopyr at the typical application rate of 1 lb/acre and under typical exposure conditions (see risk assessment for Triclopyr, page xvii – SERA 2003b). In addition, there is no route of exposure or exposure scenario suggesting that the general public will be at risk from longer-term exposure to triclopyr.

For acute exposure of triclopyr amine or triclopyr ester, the typical HQ for consumption of vegetation by an adult female is 3.0 and the lower level is 0.7. The typical HQ for long term consumption of vegetation by an adult female is 1.6 and the lower level is 0.3. However, consumption of contaminated vegetation is unlikely for the following reasons:

- Herbicide application areas are signed to preclude accidental exposure.
- With cut surface or injection application, the amount of non-target vegetation subject to spray deposition is very small.
- The long-term exposure scenario assumes that for a long term exposure to occur contaminated fruit or vegetation eaten 90 days in a row.

For triclopyr ester, the typical exposure HQ for vegetation contact of an adult female in shorts and a t-shirt is 1.3 and the lower level is less than 1.0. However, this scenario is highly unlikely since it assumes contact occurs while the vegetation is still wet and herbicide application areas are signed to preclude accidental exposure.

Imazapyr

Typical exposures to imazapyr do not lead to estimated doses that exceed a level of concern for either workers or members of the general public. There is no route of exposure or scenario suggesting that the workers or members of the general public will be at any substantial risk from longer-term exposure to imazapyr even at the upper range of application rates considered (see risk assessment for imazapyr, page xiv – SERA 2004a). All typical exposure Hazard Quotients for workers and the general public are less than 1.0 for imazapyr, therefore application of this chemical is not likely to affect human health and safety.

Imazapic

Typical exposures to imazapic do not lead to estimated doses that exceed a level of concern for either workers or members of the general public. There is no route of exposure or scenario suggesting that the workers or members of the general public will be at any substantial risk from longer-term exposure to imazapic even at the upper range of application rates considered (see risk assessment for imazapic, page xii – SERA 2004b). All typical exposure Hazard Quotients for workers and the general public are less than 1.0 for imazapic, therefore application of this chemical is not likely to affect human health and safety.

Clopyralid

There is no evidence typical or accidental exposures will lead to dose levels that exceed the level of concern for workers. For members of the general public, none of the longer term exposure scenarios approach a level of concern and none of the acute/accidental scenarios exceed a level of concern, based on central estimates of exposure (see risk assessment for Clopyralid, page xiv – SERA 2004c). All typical exposure Hazard

Quotients for workers and the general public are less than 1.0 for clopyralid, therefore application of this chemical is not likely to affect human health and safety.

Sethoxydim

None of the exposure scenarios for workers result in levels that exceed the RfD. Thus, sethoxydim does not pose any substantial risk to human health (see risk assessment for sethoxydim, pages xii-xiii, SERA 2001). All typical exposure Hazard Quotients for workers and the general public are less than 1.0 for sethoxydim, therefore application of this chemical is not likely to affect human health and safety.

The adaptive management strategy proposed in this alternative includes the use of other herbicides and differing rates if specific condition warrants their use. Only Forest Service approved herbicides would be utilized and all label instruction would be followed. Further evaluation using established analysis tools (such as SERA risk assessments) will be required prior to use to ensure that the proposed application rates and methods will not adversely affect human health and the environment.

As a result of these analyses, and given that Forest Plan Standards, project mitigation, and assumptions are met, there should be no significant negative effect to human health or safety as a result of the proposed use of herbicide to control NNIS.

Cumulative Effects

Cumulative effects include effects resulting from the use of herbicides on private land which is difficult to assess. Agriculture is a primary land use on adjacent private lands and the use of herbicides for agricultural production commonly occurs. Minor herbicide use on private land also occurs for the control of woody plants near homes.

Currently, the use of pesticides to control non-native invasive plants on the National Forest Lands on the Conasauga and Blue Ridge Ranger Districts is very limited. On the eastern portion of the Blue Ridge Ranger District, a total of approximately 30 acres of food plots are treated each year on the Swallows Creek, Coopers Creek, Chestatee, and Blue Ridge Wildlife Management Areas by Georgia Department of Natural Resources personnel on Wildlife Management Areas (Kevin Lowery, GADNR, pers. comm.) using glyphosate and sethoxydim. In 2008, USFS personnel treated approximately 15 acres of fescue fields with glyphosate to establish native warm season grasses and native forbs. Small quantities of herbicides (glyphosate) are used in developed recreation areas to control poison ivy and other unwanted vegetation.

Herbicide use is either planned or anticipated on two ecosystem restoration projects on the Blue Ridge Ranger District. In the Davenport Mountain Forest Stewardship project, herbicide use is planned for the release of oak and shortleaf pine (180 acres), woodland restoration (300 acres), wildlife opening renovation (20 acres), and NNIS control (4 acres). To date, only 15 acres of herbicide use for wildlife opening renovation has occurred (see above). An Environmental Assessment for the Brawley Mountain Project

is currently being prepared that proposes approximately 400 acres of herbicide use for habitat enhancement for golden-winged warbler and woodland restoration.

In this project, a maximum of 350 acres of herbicide use for NNIS control is proposed for the Blue Ridge and Conasauga Ranger Districts. Nonnative invasive plant control treatments are likely to be repeated on the same sites as much as 6 times during the next 10 years. Since half-lives of all of the herbicides considered are low to moderate, especially in warm weather, and they do not accumulate in soils or organisms, the effects to human health and safety are likely to be small. Safety standards on herbicide labels will be followed in all cases. Therefore, the Proposed Action should result in no cumulative effects to human health and safety.

3.3.3 Terrestrial Threatened and Endangered (T& E) and Forest Concern (Regional Forest Sensitive and Locally Rare) Species

Existing Conditions

Project-level inventories for rare plants have occurred across the analysis area since 1991. Additional inventories for rare birds, small mammals, reptiles and amphibians, fish and mollusks have also occurred during this period. During project-level plant inventories, NNIS are also recorded. The majority of NNIS tend to be located along road and trail edges and primarily consist of Nepal grass, sericea lespedeza and occasionally autumn olive, especially near old wildlife openings. Roadside sites of kudzu and Japanese knotweed are also known in the analysis area. Specific sites listed in the table of existing areas to be treated (Table 3) have populations of kudzu, oriental bittersweet, Chinese privet and Japanese knotweed. These populations form dense monocultures, especially in the case of kudzu and Japanese knotweed, leaving no habitat for other plant species, rare or otherwise. Table 1 lists the non-native invasive plants that have been documented or that have the potential to occur on the Blue Ridge and Conasauga Ranger Districts.

Federally listed species

Two federally listed plants have been found during project-level inventories in the analysis area; small whorled pogonia (*Isotria medeoloides*) and large-flowered skullcap (*Scutellaria montana*). A third federally listed plant, the green pitcher plant (*Sarracenia oreophila*), was grown in the Atlanta Botanical Garden from local genetic stock found on private land, and transplanted to USFS land in the 1980's. Male gray bats have been found foraging on FS land (Johnson 2002), probably emerging from bachelor caves known to occur on private land.

Federally listed species are directly protected in the Forest Plan (2004) through Goal 15, objective 15.1, and forest-wide standards FW-029 though FW- 032. FW – 032 states that priority will be given to sites where NNIS are threatening federally listed species, as well as to other rare species. Table 5 displays species listed under the Endangered Species Act that are known to occur on the Blue Ridge and Conasauga Ranger Districts.

Table 5. Federally Listed Species that Occur on the BRRD and CRD

Species		Status
Common Name	Scientific Name	
Plants		
Small whorled pogonia	*Isotria medeoloides*	Threatened
Green pitcher plant	*Sarracenia oreophila*	Endangered
Large flowered skullcap	*Scutellaria montana*	Threatened
Mammals		
Gray bat (foraging only-no caves)	*Myotis grisescens*	Endangered

Regional Forester's sensitive species

Regional Forester sensitive (S) species are those species which are rare throughout their range of occurrence. Forest sensitive terrestrial species with potential to occur or that are known to occur on the Blue Ridge and Conasauga Ranger Districts are displayed in Table 6.

Table 6. Regional Forester's Sensitive Species that Occur on the BRRD and CRD

Species		**Status State/Federal C**
Common Name	**Scientific Name**	
Vascular Plants		
Georgia rockcress	*Arabis georgiana*	G2/C
Spreading yellow false foxglove	*Aureolaria patula*	G2G3
American barberry	*Berberis canadensis*	G3
Alabama grape fern	*Botrychium jenmanii*	G3G4
Small mountain bittercress	*Cardamine clematitis*	G2G3
Stiff sedge	*Carex biltmoreana*	G3
Fort Mountain sedge	*Carex communis var. amplisquama*	G3
Small spreading pogonia	*Cleistes bifaria*	G3G4
Whorled stoneroot	*Collinsonia verticillata*	G3
Broadleaf tickseed	*Coreopsis latifolia*	G3
Large witchalder	*Fothergilla major*	G3
White-leaved sunflower	*Helianthus glaucophyllus*	G3
Butternut	*Juglans cinerea*	G3G4
Fraser's loosestrife	*Lysimachia fraseri*	G2
Sweet pinesap	*Monotropsis odorata*	G3
Piedmont ragwort	*Packera millefolia*	G2
Small's beardtongue	*Penstemon smallii*	G3
White fringeless orchid	*Platanthera integrilabia*	G2G3/C
Tennessee leafcup	*Polymnia laevigata*	G3
Beadle's mountain mint	*Pycnanthemum beadlei*	G2G4
Appalachian rose gentian	*Sabatia capitata*	G2

Bay starvine	*Schisandra glabra*	G3
Blue Ridge catchfly	*Silene ovata*	G2G3
Ash-leaved bush pea	*Thermopsis mollis var. fraxinifolia*	G4?T3?
Least trillium	*Trillium pusillum*	G3
Illscented trillium	*Trillium rugelii*	G3
Jeweled trillium	*Trillium simile*	G3
Birds		
Bachman's sparrow	*Aimophila aestivalis*	G3
Bald eagle	*Haliaeetus leucocephalus*	G5
Mammals		
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	G3G4
Eastern small-footed bat	*Myotis leibii*	G3
Southern water shrew	*Sorex palustris punctulatus*	G5T3
Insects		
Barrens tiger beetle	*Cincindela patruela*	G3
Diana fritillary butterfly	*Speyeria diana*	G3

Forest locally rare species

Additional species of concern on the Forest are those referred to as "locally rare". These are species that may be common across their geographic range, but are rare in Georgia. Often, these species are very common further north, but their locations in Georgia constitute the southern limits of their range. Table 7 lists locally rare species known or with potential to occur on the Blue Ridge and Conasauga Ranger Districts.

Table 7. Forest Locally Rare Species

Species		**Global(G) rank State(S) rank - State listed**
Common Name	**Scientific Name**	
Plants		
Mountain maple	*Acer spicatum*	G5 S2
Yellow giant-hyssop	*Agastache nepetoides*	G5 S1
Purple giant-hyssop	*Agastache scrophulariifolia*	G5 S1
Shining indigo bush	*Amorpha nitens*	G3? S1?
Porter's reed grass	*Calamagrostis porteri*	G4 S1 – R
Blue Ridge (silky) bindweed	*Calystegia catesbiana spp. sericata*	G3T2T3Q S2S3
Wild hyacinth	*Camassia scilloides*	G4G5 S2
Manhart's sedge	*Carex manhartii*	G3 S2S3
Broadleaf sedge	*Carex platyphylla*	G5 S1
Purple sedge	*Carex purpurifera*	G4? S2
Rough sedge	*Carex scabrata*	G5 S2
American chestnut (nut bearing	*Castanea dentata*	G4 S3

trees only)		
Indian paintbrush	*Castilleja coccinea*	G5 S2?
Golden saxifrage	*Chrysosplenium americanum*	G5 S1
Yellowwood	*Cladrastis kentuckea*	G4 S3
American lily-of-the-valley	*Convallaria majuscula*	G4? S1S2 – R
Pale corydalis	*Corydalis sempervirens*	G4G5 S1
Fraser sedge	*Cymophyllus fraserianus*	G4 S1 – T
Yellow lady's slipper	*Cypripedium parviflorum*	G5 S3 – R
Squirrel corn	*Dicentra canadensis*	G5 S1?
Bleeding heart	*Dicentra eximia*	G4 S1
Ground cedar	*Diphasiastrum tristachyum*	G5 S1
Shooting star	*Dodecatheon meadia*	G5 S3
Log fern	*Dryopteris celsa*	G4 S2
Goldie's wood fern	*Dryopteris goldiana*	G4 S3
Fringed gentian	*Gentianopsis crinita*	G5 S1 – T
Cow parsnip	*Heracleum lanatum*	G5 S1
Golden seal	*Hydrastis canadensis*	G4 S2 – E
Largeleaf waterleaf	*Hydrophyllum macrophyllum*	G5 S1
Blue Ridge St. John's wort	*Hypericum buckleyi*	G3 S1
Naked-fruit rush	*Juncus gymnocarpus*	G4 S2S3
Ground juniper	*Juniperus communis ssp. depressa*	G5T5 S1
Sand myrtle	*Leiophyllum buxifolium*	G4 S1 – T
Southern twayblade	*Listera australis*	G4 S2
Kidney-leaved twayblad	*Listera smallii*	G4 S2
Ground pine	*Lycopodium clavatum*	G5 S1
Climbing fern	*Lygodium palmatum*	G4 S2
Broadleaf bunchflower	*Melanthium latifolium*	G5 S2?
Virginia bluebell	*Mertensia virginica*	G5 S1S2
Dwarf ginseng	*Panax trifolius*	G5 S1
Silverling	*Paronychia argyrocoma*	G4 S1
Swamp lousewort	*Pedicularis lanceolata*	G5 S1 – E
Broadleaf phlox	*Phlox amplifolia*	G3G5 S1
Large purple-fringed orchid	*Platanthera grandiflora*	G5 S1
Fringeless purple orchid	*Platanthera peramoena*	G5 S1
Small purple-fringed orchid	*Platanthera psycodes*	G5 S1?
Spotted mandarin	*Prosartes maculatum*	G3G4 S3?
Fire cherry	*Prunus pensylvanica*	G5 S2
Choke cherry	*Prunus virginiana*	G5 S1
Virginia mountain mint	*Pycnanthemum virginianum*	G5 S1
Staghorn sumac	*Rhus typhina*	G5 S1
Red elderberry	*Sambucus racemosa spp. pubens*	G4T4T5 S1
Canada burnet	*Sanguisorba canadensis*	G5 S1 – T

Showy skullcap	*Scutellaria serrata*	G4G5 S1
Three-toothed cinquefoil	*Sibbaldiopsis tridentata*	G5 S1 – E
Biltmore carrionflower	*Smilax biltmoreana*	G4? S3?
American mountain ash	*Sorbus americana*	G5 S1
Hardhack	*Spirea tomentosa*	G5 S1
Oval ladies' tresses	*Spiranthes ovalis*	G5? S2S3
Hedge nettle	*Stachys nuttallii*	G5? S2
Mountain camellia	*Stewartia ovata*	G4 S3?
Rosy twisted stalk	*Streptopus lanceolatus*	G5 S1 – T
Tufted club rush	*Trichophorum cespitosum*	G5 S1
Starflower	*Trientalis borealis*	G5 S1S2 – E
Barksdale trillium	*Trillium sulcatum*	G4 S2
Horse gentian	*Triosteum aurantiacum*	G5 S2?
Three-birds orchid	*Triphora trianthophora*	G3G4 S2?
Bearberry	*Vaccinium erythrocarpum*	G5 S1
American false hellebore	*Veratrum viride*	G5 S2
Ozark bunchflower	*Veratrum woodii*	G5 S2 – R
American dog violet	*Viola conspersa*	G5 S3
Turkeybeard	*Xerophyllum asphodeloides*	G4 S1 - R
Birds (for Nesting only)		State ranks not listed because they don't reflect nesting
Cedar waxwing	*Bombycilla cedrorum*	G5
Common raven	*Corvus corvax*	G5 – R
Cerulean warbler	*Dendroica cerulea*	G4 – R
Least flycatcher	*Empidonax minimus*	G5
Willow flycatcher	*Empidonax trailii*	G5
Red crossbill	*Loxia curvirostra*	G5
Rose-breasted grosbeak	*Pheucticus ludovicianus*	G5
Golden-crowned kinglet	*Regulus satrapa*	G5
Red-breasted nuthatch	*Sitta canadensis*	G5
Winter wren	*Troglodytes troglodytes*	G5
Golden-winged warbler	*Vermivora chrysoptera*	G4 – E
Canada warbler	*Wilsonia canadensis*	G5
Mammals		
Southern Appalachian woodrat	*Neotoma floridana haematoreia*	G5T4Q S3
Appalachian cottontail	*Sylvilagus obscurus*	G4 S1S2 – R
Least weasel	*Mustela nivalis*	G5 S1
Long tail or rock shrew	*Sorex dispar*	G4 S1
Red squirrel	*Tamiasciurus hudsonicus*	G5 S3
Star-nosed mole	*Condylura cristata*	G5 S2?

Reptiles		
Northern pine snake	*Pituophis m. melanoleucus*	G4T4 S3
Coal skink	*Eumeces anthracinus*	G5 S2
Amphibians		
Green salamander	*Aneides aeneus*	G3G4 S2 – R

Prior to any treatment of NNIS, sites will be analyzed using the Implementation Checklist for the Treatment of NNIS Species, found in Appendix 2 of this document. Ways in which the proposed action could affect all categories of rare species will be discussed in detail in the Biological Evaluation for the proposal. General effects of the alternatives on terrestrial rare plants and animals are summarized below.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects
This alternative will perpetuate the current conditions, allowing non-native invasive plants to spread and overtake native plants and communities. There is the potential for invasive plants to eventually become established in locations containing rare species, with the direct effects of displacing the plants and animals. The NNIS listed above will continue to grow and spread within their current locations. Some would also spread to other sites by means of natural mechanisms such as seed dispersal by hikers, birds and other animals, wind and water. Species such as mimosa and Chinese privet will also continue to expand and form vigorous colonies from root sprouts. Kudzu will spread rapidly by vegetative means, with potential to expand as far as 60 feet in a growing season (Bergmann and Swearingen, 2005).

Rare species would be indirectly affected by the no action alternative due to habitat degradation making sites unsuitable for them. For example, plants necessary for animals such as larval and nectar host plants for the Diana fritillary, would be unable to compete with the spread of the invasive plants.

Cumulative Effects
Large populations of NNIS occur on nearby private land, and they are likely to spread to FS land regardless of FS activities. Conversely, where disturbed private land is in close proximity to FS property, seeds of NNIS present on FS land could spread to private land by means of animals, water, wind, and human dispersal (i.e. seeds adhering to clothing and vehicles). Although this could occur to some degree even under Alternative 2 (since 100% eradication of NNIS would be impossible), spread and proliferation of NNIS would be much greater under the no action alternative. In addition, the expansion of these invasive plants as a result of the no action alternative, would lead to an overall decrease in biodiversity in the analysis area, both on FS and private land.

Surveys have been and continue to be conducted in portions of the Forest to determine presence and distribution of various small mammals, birds, amphibians and reptiles, aquatic species, and TES and locally rare plants. The Georgia National Heritage Program (GNHP)

records are checked for known occurrences of TES and locally rare species in project areas, and close contact is maintained between the GNHP biologists and Forest Service biologists for sharing of new information. Forest Service records and other agencies' biologists and records (in addition to GNHP) are also consulted for occurrences.

Future management activities and project locations will be analyzed utilizing any new information available on viability concern species. Mitigating measures will be implemented where needed to maintain habitat for Sensitive and locally rare species on the Forest, and to prevent future listing under the Endangered Species Act.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects

The proposed action of non-native invasive plant control and eradication would have the effects of opening up habitat for reestablishment of native species, both rare and non-rare. Biodiversity would be increased and the potential for eventual dominance of NNIS over native species would be greatly decreased.

Adverse direct and indirect effects, as from herbicide impacting non-target species, would be avoided through mitigation measures discussed in the mitigation section of this EA. This includes using the lowest rate of herbicide that is effective for the project objectives and choosing formulations that minimize any risks to plants and animals. Forest Plan standard FW-019 also specifically addresses herbicide use in the vicinity of rare plants and the fact that a non- soil-active herbicide must be used in such instances.

Risk analysis for all herbicides considered may be found in the project file and will be discussed in detail for terrestrial animals in the Biological Evaluation. In summary, if a Hazard Quotient (HQ) is 1.0 or less, it may be interpreted that exposure levels at this rate are not a concern for the animal. All herbicides analyzed at the standard application rates have a HQ of less than 1.0 for terrestrial animals.

Prescribed fire is another potential control method for NNIS, although it would be likely used on a limited basis, such as in bogs or wildlife openings. Although Evans et al. (2006) reports that many of the NNIS that are found commonly in the analysis area recolonize or resprout after fire, there is no indication that any of the species are promoted by prescribed burning. Evans et al (2006) state that prescribed burning late in the growing season can help to control Nepal grass, which is an annual, but that it can easily reestablish on bare soil. However, Forest Service standards for prescribed burning do not allow for burning to bare soil. Although burning does not eradicate honeysuckle, several studies have demonstrated that prescribed burning inhibits spread by killing seedlings and young plants (Nuzzo 1997). Land managers in Alabama have controlled privet by means of burning when done annually under particular environmental conditions (Batcher 2000).

When laying out prescribed burns, existing roads, trails, and streams are used as firelines where feasible. When bladed firelines are required, the lines are inventoried for the presence of rare plants prior to ground disturbance. In addition, when growing season burns are proposed, the area to be burned is also inventoried for rare species, and if any are found they are protected from any adverse effects of the fire. For the above reasons, prescribed burning for control of NNIS should have no adverse impacts on rare plants. Monitoring of the sites will be key to ensuring that NNIS do not establish in new sites after prescribed burning.

Potential effects of prescribed burning on animals will be discussed in more detail in the BE. In general, bats will relocate during prescribed burning activities. The Rafinesque's big-eared bat is known to be easily disturbed from its roost (Ozier 1999). Other small mammals such as the shrew and mole will use sites such as stump and root holes, mole tunnels, and spaces under rocks and logs to avoid direct impacts of prescribed fire (Ford et al. 1999). Insects would likely avoid the area during fire by flying away or in the case of beetles, utilizing the same types of refugia as the small mammals. The Northern pine snake spends much of its time underground in burrows (Mount 1975) and would avoid any fire in this manner.

Mechanical methods such as hand-pulling and digging of small, localized infestations of NNIS would have no adverse effects on rare species.

Cumulative Effects

Large populations of NNIS occur on nearby private land, and they are likely to spread to FS land regardless of FS activities. Conversely, where disturbed private land is in close proximity to FS property, seeds of NNIS present on FS land could spread to private land by means of animals, water, wind, and human dispersal (i.e. seeds adhering to clothing and vehicles). Although this could still occur to some degree under Alternative 2 (since 100% eradication of NNIS would be impossible), spread and proliferation of NNIS would be much less under this alternative than under the no action alternative. Biodiversity across the landscape would be increased.

Surveys have been and continue to be conducted in portions of the Forest to determine presence and distribution of various small mammals, birds, amphibians and reptiles, aquatic species, and TES and locally rare plants. The Georgia National Heritage Program (GNHP) records are checked for known occurrences of TES and locally rare species in project areas, and close contact is maintained between the GNHP biologists and Forest Service biologists for sharing of new information. Forest Service records and other agencies' biologists and records (in addition to GNHP) are also consulted for occurrences.

Future management activities and project locations will be analyzed utilizing any new information available on viability concern species. Mitigating measures will be implemented where needed to maintain habitat for Sensitive and locally rare species on the Forest, and to prevent future listing under the Endangered Species Act.

3.3.4 Aquatic Threatened and Endangered (T& E) and Forest Concern (Regional Forest Sensitive and Locally Rare) Species

Existing Conditions
Numerous aquatic inventories have been conducted on the Blue Ridge and Conasauga Ranger Districts through annual fish sampling by DNR and FS personnel, as well as projects conducted by researchers. These inventories have resulted in documentation of many rare aquatic species on the 2 Districts.

Federally listed species
In Table 8 is a list of species listed under the Endangered Species Act that are known or have potential to occur in drainages on the Blue Ridge and Conasauga Districts.

Table 8. Federally Listed Aquatic Species

Fish		
Blue shiner	*Cyprinella caerulea*	Threatened
Etowah darter	*Etheostoma etowahae*	Endangered
Amber darter	*Percina antesella*	Endangered
Goldline darter	*Percina aurolineata*	Threatened
Conasauga logperch	*Percina jenkinsi*	Endangered
Mussels		
Fine-lined pocketbook	*Hamiota altilis*	Threatened
Alabama moccasinshell	*Medionidus acutissimus*	Threatened
Coosa moccasinshell	*Medionidus parvulus*	Endangered
Southern clubshell	*Pleurobema decisum*	Endangered
Southern pigtoe	*Pleurobema georgianum*	Endangered
Ovate clubshell	*Pleurobema perovatum*	Endangered
Triangular kidneyshell	*Ptychobranchus greeni*	Endangered

Regional Forester aquatic sensitive species known or with potential to occur on the Blue Ridge and Conasauga Ranger District are in Table 9 below.

Table 9. Regional Forester Aquatic Sensitive Species

Species		**Status State/Federal C**
Common Name	**Scientific Name**	
Nonvascular Plants		
A hornwort	*Megaceros aenigmaticus*	G2G3
Reptiles		
Bog turtle	*Glyptemys muhlenbergii*	G3
Crustaceans		
Conasauga blue burrower	*Cambarus cymatilis*	G1
Chickamauga crayfish	*Cambarus extraneus*	G2
Hiwassee headwaters crayfish	*Cambarus parrishi*	G1

Fish		
Holiday darter	*Etheostoma brevirostrum*	G2
Coldwater darter	*Etheostoma ditrema*	G1G2
Trispot darter	*Etheostoma trisella*	G1
Wounded darter	*Etheostoma vulneratum*	G3
Lined chub	*Hybopsis lineapunctata*	G3
Mountain brook lamprey	*Ichthyomyzon greeleyi*	G3
Popeye shiner	*Notropis ariommus*	G3
Frecklebelly madtom	*Noturus munitus*	G3
Freckled darter	*Percina lenticula*	G2
Mussels		
Tennessee heelsplitter	*Lasmigona holstonia*	G3
Georgia pigtoe	*Pleurobema hanleyianum*	GHQ/C
Ridged mapleleaf	*Quadrula rumphiana*	G3
Alabama creekmussel	*Strophitus connasaugaensis*	G3
Alabama rainbow	*Villosa nebulosa*	G3
Aquatic Insects		
Georgia beloneurian stonefly	*Beloneuria georgiana*	G1G3
Cherokee clubtail	*Gomphus consanguis*	G2G3
Mountain river cruiser	*Macromia margarita*	G2G3
Edmund's snaketail	*Ophiogomphus edmundo*	G1
Appalchian snaketail	*Ophiogomphus incurvatus*	G3

In addition, there are several locally rare aquatic species known or with potential to occur on the Blue Ridge and Conasauga Ranger Districts which are listed in Table 10.

Table 10. Locally Rare Aquatic Species

Species		**Global(G) rank State(S) rank - State listed**
Common Name	**Scientific Name**	
Amphibians		
Hellbender	*Cryptobranchus alleganiensis*	G3G4 S3 – T
Dwarf black-bellied salamander	*Desmognathus folkertsi*	G1G2 S2
4-toed salamander	*Hemidactylium scutatum*	G5 S2
Mudpuppy	*Necturus maculosus*	G5 S1
Crustaceans		
Coosawattae crayfish	*Cambarus coosawattae*	G1 S1
Etowah crayfish	*Cambarus fasciatus*	G3 S2 – T
Hiawassee crayfish	*Cambarus hiwasseensis*	G3G4 S3
A crayfish	*Cambarus manningi*	G4 S2
Fish		

Rosyside dace	*Clinostomus funduloides*	G5 S1S2
Blotched chub	*Erimystax insignis*	G3G4 S2 – E
Greenfin darter	*Etheostoma chlorobranchium*	G4 S1 – T
Coosa darter	*Etheostoma coosae*	G4 S3
Greenbreast darter	*Etheostoma jordani*	G4 S2S3
Redline darter	*Etheostoma rufilineatum*	G5 S2
Rock darter	*Etheostoma rupestre*	G4 S2S3 – R
Snubnose darter	*Etheostoma simoterum*	G5 S3
Banded darter	*Etheostoma zonale*	G5 S1S2
Bigeye chub	*Hybopsis amblops*	G5 S2
Speckled chub	*Macrhybopsis hyostoma*	G5 S1S2
River redhorse	*Moxostoma carinatum*	G4 S2 – R
Greater jumprock	*Moxostoma lachneri*	G4 S3
Sicklefin redhorse	*Moxostoma sp.2*	G2Q S1 – E Federal 'C'
Burrhead shiner	*Notropis asperifrons*	G4 S2 – T
Rainbow shiner	*Notropis chrosomus*	G4 S3
Silver shiner	*Notropis photogenis*	G5 S1 – E
Tangerine darter	*Percina aurantiaca*	G4 S1 - E
Bridled darter	*Percina kusha*	G1Q S1 - E
Bronze darter	*Percina palmaris*	G4 S2
Dusky darter	*Percina sciera*	G5 S1 – R
River darter	*Percina shumardi*	G5 S1 – E
Riffle minnow	*Phenacobius catostomus*	G4 S3
Mussels		
Delicate spike	*Elliptio arctata*	G3G4 S3 – E

Ways in which the proposed action could affect all categories of rare species will be discussed in detail in the Biological Evaluation for the proposal. General effects of the alternatives on aquatic rare plants and animals are summarized below.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects
This alternative will perpetuate the current conditions, allowing non-native invasive plants to spread unchecked.

Nepal grass and Chinese privet are often found in riparian areas, where privet is the primary NNIS found in these sites. The spread of these 2 species as a result of no action could indirectly affect aquatic insects, reptiles, amphibians, and crayfish by degrading their habitat. Two of the known sites to be treated (Table 2), Mountaintown and Hurricane Creeks, are riparian areas with extensive privet that would continue to spread under Alternative 1. Extensive privet colonies in riparian sites could preclude

crustaceans, such as the Conasauga blue burrower, from constructing their burrows. Nepal grass has been seen to choke-out native vegetation and overgrow sphagnum in a sphagnum bog, negatively affecting the hydrology of this particular bog which would have otherwise been potential habitat for the bog turtle.

The one rare aquatic plant, the Megaceros hornwort, occurs on streamside rocks. It is not likely to be impacted by the no action alternative.

Cumulative Effects
Large populations of NNIS occur on nearby private land, and they are likely to spread to FS land regardless of FS activities. Conversely, where disturbed private land is in close proximity to FS property, seeds of NNIS present on FS land could spread to private land by means of animals, water, wind, and human dispersal (i.e. seeds adhering to clothing and vehicles). Although this could occur to some degree even under Alternative 2 (since 100% eradication of NNIS would be impossible), spread and proliferation of NNIS would be much greater under the no action alternative. In addition, the expansion of these invasive plants as a result of the no action alternative, would lead to an overall decrease in biodiversity in the analysis area, both on FS and private land.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects
The proposed action of NNIS control and eradication would have the effects of opening up habitat for reestablishment of native species, both rare and non-rare. Biodiversity would be increased and the potential for eventual dominance of NNIS over native species would be greatly decreased.

Adverse direct and indirect effects, as from herbicide impacting non-target species, would be avoided through mitigation measures discussed in the mitigation section of this EA. This includes using the lowest rate of herbicide that is effective for the project objectives and choosing formulations that minimize any risks to plants and animals. Furthermore Forest Plan standard FW-022 states that no herbicide application may occur within 100 horizontal feet of lakes, wetlands, or perennial or intermittent springs and streams, except where aquatic-labeled herbicides are used to prevent environmental damage such as NNIS infestations. Forest Plan standards FW-023 through FW-025 also address herbicide use restrictions near aquatic habitats. Compliance with these standards and mitigation measures listed in the mitigation section of this document, ensure there would be no herbicide movement from the riparian zone into the streams and thus no adverse impacts on aquatic species.

Risk analysis for all herbicides considered may be found in the project file and will be discussed in detail for aquatic species in the Biological Evaluation. In summary, if a Hazard Quotient (HQ) is 1.0 or less, it may be interpreted that exposure levels at this rate are not a concern for the animal. Some of the herbicides analyzed at the standard application rates have a HQ of greater than 1.0 for aquatic animals in the event of accidental spills. The accidental spill scenario is very extreme and is highly unlikely to

occur on the Forest, involving a large herbicide spill into a small pond (SERA 2003a). Also, some of the herbicides are highly immobile in soil due to their adsorption by soil particles. These reasons, along with the Forest Plan standards mentioned above, will prevent any likelihood of herbicide adversely impacting aquatic species.

Prescribed fire is another potential control method for NNIS, but would most likely be used only on a limited basis. In some sites this might be preferable to using herbicide (even if labeled for aquatic use) for control as in sites where the NNIS is within 100 horizontal feet of a wetland. Privet is one of the NNIS often found in riparian areas. Land managers in Alabama have controlled privet by means of annual burning when conducted under particular environmental conditions (Batcher 2000). Prescribed fire in riparian zones is generally of low intensity and during these activities riparian corridor standards found in Forest Plan (MRx 11) and Best Management Practices (BMP's) will protect water quality and aquatic habitat from adverse impacts.

Mechanical methods such as hand-pulling (e.g. for Nepal grass) and digging of small infestations of NNIS (e.g. privet) would have no adverse effects on rare aquatic species. Digging would be by hand and care taken that when digging NNIS in riparian areas, dirt would not be dumped into the stream.

The one rare aquatic plant, the Megaceros hornwort which occurs on streamside rocks, would also be protected by the previously mentioned herbicide restrictions that are found in the Forest Plan.

Cumulative Effects

Large populations of NNIS occur on nearby private land, and they are likely to spread to FS land regardless of FS activities. Conversely, where disturbed private land is in close proximity to FS property, seeds of NNIS present on FS land could spread to private land by means of animals, water, wind, and human dispersal (i.e. seeds adhering to clothing and vehicles). Although this could still to some degree under Alternative 2 (since 100% eradication of NNIS would be impossible), but spread and proliferation of NNIS would be much less under this alternative than under the no action alternative. Biodiversity across the landscape would be increased.

Surveys have been and continue to be conducted in portions of the Forest to determine presence and distribution of various small mammals, birds, amphibians and reptiles, aquatic species, and TES and locally rare plants. The Georgia National Heritage Program (GNHP) records are checked for known occurrences of TES and locally rare species in project areas, and close contact is maintained between the GNHP biologists and Forest Service biologists for sharing of new information. Forest Service records and other agencies' biologists and records (in addition to GNHP) are also consulted for occurrences.

Future management activities and project locations will be analyzed utilizing any new information available on viability concern species. Mitigating measures will be implemented where needed to maintain habitat for Sensitive and locally rare species on the Forest, and to prevent future listing under the Endangered Species Act.

3.3.4 Management Indicator Species (MIS)

Current Situation
The information provided in this section will be used to disclose and analyze the potential effects the proposed action may have on Management Indicator Species, often referred to as MIS.

MIS are selected and monitored because their populations or habitats are thought to be affected by land management activities. Initially, all MIS species which are listed on the Chattahoochee-Oconee National Forest (CONF) were considered in this analysis. The CONF has a total of 15 MIS. A list of these species and their important habitat components are listed in Table 11. Of these species, only those species and their habitats which might be directly or indirectly affected by the proposed action or no action alternative will be analyzed in detail. This list includes 11 species which comprise 2 major classes of animals - mammals and birds.

Table 11. Management Indicator Species

Species	Purpose as MIS	Selected to be Analyzed Further	Reason for Selection/Non-Selection
Black Bear	To help indicate effects of management on supplying public demand for bear hunting and viewing.	Yes	Habitat may be affected by NNIS encroachment
White-tailed Deer	To help indicate effects of management on supplying public demand for deer hunting and viewing.	Yes	Habitat may be affected by NNIS encroachment
Pileated Woodpecker	To help indicate effects of management on snags.	Yes	Habitat may be affected by NNIS encroachment
Ovenbird	To help indicate the effects of management on Forest Interiors (Chattahoochee NF).	Yes	Habitat may be affected by NNIS encroachment
Pine Warbler	To help indicate the effects of management on Pine, Pine- Oak Forests.	Yes	Habitat may be affected by NNIS encroachment
Acadian Flycatcher	To help indicate the effects of management on Mid-Late	Yes	Habitat may be affected by NNIS encroachment

	Successional Riparian Habitats.		
Hooded Warbler	To help indicate the effects of management on Mid-Late Successional Mesic Deciduous Forests.	Yes	Habitat may be affected by NNIS encroachment
Scarlet Tanager	To help indicate the effects of management on Oak Forests.	Yes	Habitat may be affected by NNIS encroachment
Prairie Warbler	To help indicate the effects of management on Early Successional Forests.	Yes	Habitat may be affected by NNIS encroachment
Swainson's Warbler	To help indicate the effects of management on Early Successional Riparian Forests (Oconee NF).	No	Swainson's Warbler was selected as a MIS for early successional riparian habitats on the Oconee NF, primarily canebrakes.
Field Sparrow	To help indicate the effects of management on Woodland, Savanna and Grassland Communities.	Yes	Habitat may be affected by NNIS encroachment
Red-cockaded Woodpecker	To help indicate effects of management on recovery of this endangered species, and on Mid-Late Successional Pine Forest community (Oconee NF).	No	Species does not occur on the Chattahoochee NF.
Wood Thrush	To help indicate the effects of management on Forest Interiors (Oconee NF).	No	Wood thrush was selected as a MIS for the Oconee NF, to help indicate the effects of management actions on forest interior habitat. The Ovenbird is used as the MIS for this habitat on the Chattahoochee NF.
Chestnut-sided Warbler	To help indicate the effects of management on high elevation Early Successional Forests.	Yes	Habitat may be affected by NNIS encroachment
Smooth Coneflower	To help indicate effects of management on recovery of this	No	On the Chattahoochee NF, smooth coneflower is known only to occur on the

	endangered species.		Chattooga Ranger District in Habersham and Stephens Counties.

Hooded Warbler - The revised Forest Plan identified the hooded warbler as a MIS to help indicate the effects of management on species associated with mature mesic deciduous forests. Hooded warblers are found in mixed hardwood forests of beech, maple, hickory and oaks with dense undergrowth (DeGraaf et al 1991). They nest in the understory of deciduous forests, and a dense shrub layer and scant ground cover are important (NatureServe 2008). Mature forests with a structurally diverse understory and midstory layers are favored. They typically inhabit mature forests containing canopy gaps (La Sorte et al 2007). The Hooded Warbler is a common breeding bird on the BRRD and CRD. Given the availability of mature mesic deciduous forest habitat across both districts, population levels likely are moderate. Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), there is strong evidence suggesting that hooded warblers have decreased on National Forests in the Southern Blue Ridge (La Sorte et al 2007). However this analysis indicates that hooded warbler populations have increased on the Chattahoochee-Oconee National Forest over this same time period.

Scarlet Tanager - The revised Forest Plan identified the Scarlet Tanager as a MIS to help indicate the effects of management on species associated with mature upland oak communities. The scarlet tanager is most abundant in mature, upland deciduous forests (Hamel 1992). It is most common in areas with a relatively closed canopy, a dense understory with a high diversity of shrubs, and limited ground cover (NatureServe 2008). The scarlet tanager is a common breeding bird on the BRRD and the CRD. Given the availability of mature upland oak forest habitat across both districts, population levels likely are moderate. Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), scarlet tanager populations have been stable on National Forests in the Southern Blue Ridge (La Sorte et al 2007). However this analysis indicates that scarlet tanager populations have increased on the Chattahoochee-Oconee National Forest over this same time period.

Pine Warbler - The revised Forest Plan identified the pine warbler as a MIS to help indicate the effects of management on species associated with yellow pine and pine-oak forests. The pine warbler uses mid to late successional pine forests throughout the year (Hamel 1992). It occurs in both open pine woodlands and dense pine plantations, but seldom uses hardwood stands. The highest numbers seem to occur where pure stands of pine are found. It is less abundant as the proportion of hardwood tree species increases (NatureServe 2007). The pine warbler is a common breeding bird on the BRRD and CRD. Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), pine warbler populations have been stable on National Forests in the Southern Blue Ridge (La Sorte et al 2007). This analysis indicates that pine warbler populations also have been stable on the Chattahoochee-Oconee National Forest over this same time period.

Field Sparrow - The revised Forest Plan identifies the field sparrow to help indicate the effects of management on species associated with woodland, savanna, and grassland communities. Field sparrows are associated with scattered saplings or shrubs in tall weedy or herbaceous cover (Hamel 1992). Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), field sparrow populations have been stable to declining on National Forests in the Southern Blue Ridge (La Sorte et al 2007). The sample size was too small to determine a significant trend on the entire Chattahoochee-Oconee National Forest during this same time period.

Ovenbird - The revised Forest Plan identified the ovenbird as a MIS to help indicate the effects of management on species associated with interior forest habitats on the Chattahoochee National Forest. Ovenbirds are strongly associated with mature forest interior habitats (Hamel 1992, Crawford et al. 1981). They generally breed in closed canopy deciduous or mixed forests with limited understory. The availability of older hardwood stands on the Forest has increased over the last few decades. The ovenbird is a common breeding bird on the BRRD and the CRD. Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), ovenbird populations have been stable on National Forests in the Southern Blue Ridge (La Sorte et al 2007). This analysis indicates that ovenbird populations also have been stable on the Chattahoochee-Oconee National Forest over this same time period.

Prairie Warbler, Chestnut-sided Warbler- The revised Forest Plan identified the prairie warbler and the chestnut-sided warbler as MIS to help indicate the effects of management on species associated with early successional habitats. These communities are areas where vegetations (whether grassy or forested) are less than 10 years old. This includes areas with permanent maintenance such as power line and road right-of-ways, pastures and permanent openings and areas of temporary disturbance due to natural events (i.e. tornado damage) or timber harvest.

Prairie warblers are shrubland nesting birds found in suitable habitats throughout the Southern Appalachians, Piedmont, and Coastal Plain (Hamel 1992). Prairie warblers require dense forest regeneration or open shrubby conditions in a forest setting. Near optimal habitat conditions are characterized by regeneration, thinned areas or patchy openings 10 acres or more in size (Nature Serve 2008). Populations respond favorably to conditions created 3 to 10 years following regeneration in larger forest patches (Lancia et al. 2000). Prairie warblers occur through the Forest. The prairie warbler is a common breeding bird on the BRRD and the CRD. Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), prairie warbler populations have decreased on National Forests in the Southern Blue Ridge (La Sorte et al 2007). This analysis indicates that pine warbler populations have been stable on the Chattahoochee-Oconee National Forest over this same time period.

Chestnut-sided warblers are found in second-growth forests, overgrown fields, woodland edges, and in open, park-like woods (Hamel 1992). They are most common in suitable habitat over 3500 feet elevation, but occur sparingly down to 2000 feet and below. They are associated with dense vegetation in the form of shrubs and small trees

about 3 feet above the ground that provides nesting sites and foraging areas (DeGraaf et al. 1991). Chestnut-sided warblers can be found in early successional forest habitats at higher elevations which are limited, but do occur throughout the Forest. Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), chestnut-sided warbler populations have declined on National Forests in the Southern Blue Ridge (La Sorte et al 2007). This analysis indicates that chestnut-sided warbler populations have increased on the Chattahoochee-Oconee National Forest over this same time period, however sample sizes are relatively low.

Pileated Woodpecker - The revised Forest Plan identified the pileated woodpecker as a MIS to help indicate the effects of management on species that utilize snags. Habitat consists of mature (60+ years) and extensive hardwood and hardwood-pine forest (Hamel 1992). Preferred habitat is primarily deep woods, swamps, or river bottom forests. The pileated woodpecker can also be found in rather open, upland forest of mixed forest types. This bird forages and nests on and in snags, with some foraging also occurring on fallen logs and other forest debris. This species requires snags for nesting and foraging. The Pileated Woodpecker is a common breeding bird on the BRRD and CRD. Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), Pileated woodpecker populations have been increased on National Forests in the Southern Blue Ridge (La Sorte et al 2007).

Acadian Flycatcher - The revised Forest Plan identified the Acadian Flycatcher as the MIS to represent Mid-Late Successional Riparian Habitat Conditions. Habitat for the Acadian flycatcher consists of deciduous forests near streams (Hamel 1992). Preferred habitat for this species is moist bottomlands, swamps, and riparian thickets. Usually this bird builds its nest in branches directly overhanging streams. The Acadian Flycatcher has not been reported from Breeding Bird Surveys in the Brawley project area. However, most of survey points were in upland areas. The Acadian flycatcher is a common breeding bird on the BRRD and CRD. Based on recent analysis of breeding bird population trends on Southern National Forests (1992-2004), Acadian Flycatcher populations have been stable on National Forests in the Southern Blue Ridge (La Sorte et al 2007). This analysis indicates that Acadian Flycatcher populations also have been stable on the Chattahoochee-Oconee National Forest over this same time period.

White-tailed deer - White-tailed deer require a mixture of forest/successional stage habitats to meet their year-round habitat needs. Key requirements include the interspersion of mature mast producing stands during fall and winter, early successional forest to provide browse and soft mast, and high quality permanent openings (USDA Forest Service 2004). Habitats are enhanced in many parts of the forest through permanent openings maintained by the USFS and the Georgia DNR. White-tailed deer was selected as a MIS to help indicate the effects of management in meeting public demand as a hunted species. Deer harvest data collected by Georgia DNR personnel indicates that deer populations in the mountains and ridge and valley are stable to increasing with some fluctuations primarily due to differences in the annual mast crops (USDA Forest Service 2006).

Black bear - In the Southern Appalachians, important habitat elements for black bears are habitat diversity, den site availability, availability of hard mast, and habitat remoteness (USDA Forest Service 2004). Black bear habitats are enhanced in many parts of the forest through permanent openings maintained by the USFS and the Georgia DNR. This species was selected as a MIS to help indicate the effects of management in meeting public demand as a hunted species. Based on harvest records and bear and human encounters, state biologists have concluded that bears are nearing carrying capacity on the Chattahoochee NF.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects
Under this alternative no manual, mechanical or chemical treatments of NNIS would take place; therefore there would be no immediate direct effects to wildlife habitats on the Districts. However, through time, the continued spread of NNIS will degrade forest habitats, including habitats for these MIS.

Cumulative Effects
In the long term, a general loss of biodiversity would occur as NNIS continue to establish themselves across the BRRD and CRD. NNIS species have an advantage over native vegetation because they do not have natural predators. As a result, they are able to exploit areas of human and natural disturbance. This is especially true in early successional habitats because of the increased availability of open ground and increased sunlight. Natural events such as flooding, disease and insect outbreaks and windthrow will create areas of open soil and increased sunlight which will increase the spread of NNIS. The long term effects would be a decrease in biodiversity across the Forest. A loss of biodiversity in the forest habitats of the BRRD and CRD could lead to an overall decline in populations of these MIS species.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects
The proposed action would treat up to 530 acres of NNIS per year by either manual, cultural or chemical methods. Treatment of NNIS would promote the development of native species in MIS habitats and would have a positive effect on MIS.

Manual treatment methods can include hand-pulling, digging (manually or mechanically), or the use of mechanized equipment (i.e. farm tractors, mowers, or dozers). These methods may have adverse impacts on MIS habitats, but any potential impacts would be negligible due to their temporary nature and the small portion of habitat that would be affected. In the long-term, by controlling NNIS and releasing native species from competition, MIS habitats should benefit from these treatments.

The proposed cultural treatments include the use of fire, mulch, or other gardening techniques such as weed cloths and plastic sheeting, or propane weed torch to spot-burn specific invasive plants. The weed torch will primarily be used in plant communities such as bogs or areas with low potential to carry a fire. Any prescribed fire would be applied in accordance with approved burn plans. Prescribed fire itself would have no direct effects on birds, deer or bears, because they would temporarily abandon the area being burned. These methods may have impacts on MIS habitats, but any potential impacts would be negligible due to their temporary nature and the small portion of habitat that would be affected. In the long-term, by controlling NNIS and releasing native species from competition, MIS habitats should benefit from these treatments.

For all herbicides considered, risk analysis was completed using methodology developed for the Forest Service by Syracuse Environmental Research Associates (SERA – Version 4.04). The details of the risk assessment results are available in the project file. In summary, if a Hazard Quotient (HQ) is 1.0 or less, it may be interpreted that exposure levels at this rate are not a concern for the animal. All herbicides analyzed have typical exposure HQ of less than 1.0 for terrestrial animals indicating that the application of these chemicals do not pose a risk to these species. The risk characterization for each herbicide is summarized below.

Glyphosate

Based on the current data, it has been determined that effects to birds, mammals, fish and invertebrates are minimal. At the typical application rate of 2 lbs a.e./acre, none of the hazard quotients for acute or chronic exposure scenarios reach a level of concern, even at the upper ranges of exposure for terrestrial organisms. (see risk assessment for Glyphosate, page xxii -SERA 2003a). All proposed application rates are less than 2 lb/acre. All typical exposure Hazard Quotients for terrestrial animals are less than 1.0 for glyphosate, therefore application of this chemical is not likely to affect these species.

Triclopyr

For terrestrial mammals, the central estimates of hazard quotients do not exceed the level of concern for any exposure scenarios. At the upper range of exposures, the hazard quotients exceed the level of concern for large mammals and large birds consuming contaminated vegetation exclusively at the application site (see risk assessment for Triclopyr, page xxii – SERA 2003b). The upper bound hazard quotients are not of significant concern because with cut surface or injection application, the amount of non-target vegetation subject to spray deposition is very small. In addition, the scenario assumes a diet composed of 100% contaminated vegetation from the site for 90 consecutive days. Large mammals and birds have highly variable diets which include hard and soft mast as well as green vegetation along with fairly large home ranges. The rate at which treated vegetation becomes unappetizing and then unavailable to foraging mammals following treatment make the assumptions proposed for this scenario quite unrealistically conservative for the project. All typical exposure Hazard Quotients for

terrestrial animals are less than 1.0 for triclopyr, therefore application of this chemical is not likely to affect these species.

Imazapyr

Adverse effects in terrestrial or aquatic animals do not appear to be likely. The weight of evidence suggests that no adverse effects in mammals, birds, fish, and terrestrial or aquatic invertebrates are plausible using typical or worst-case exposure assumptions at the typical application rate of 0.45 lb/acre or the maximum application rate of 1.25 lb/acre (see risk assessment for imazapyr, page xvii – SERA 2004a). All typical exposure Hazard Quotients for terrestrial animals are less than 1.0 for imazapyr, therefore application of this chemical is not likely to affect these species.

Imazapic

Adverse effects in terrestrial or aquatic animals do not appear to be likely. The weight of evidence suggests that no adverse effects in mammals, birds, fish, and terrestrial or aquatic invertebrates are plausible using typical or worse-case exposure assumptions at the typical application rate of 0.1/lb/acre or the maximum application rate of 0.1875 lb/acre (see risk assessment for imazapic, page xv – SERA 2004b). All typical exposure Hazard Quotients for terrestrial animals are less than 1.0 for imazapic, therefore application of this chemical is not likely to affect these species.

Clopyralid

Clopyralid appears to be relatively non-toxic to terrestrial or aquatic animals, is highly selective in its toxicity to terrestrial plants, and relatively non-toxic to aquatic plants. Thus, the potential for substantial effects on non-target species appears to be remote. No adverse effects are anticipated in terrestrial or aquatic animals from the use of clopyralid in Forest Service programs at the typical application rate of 0.35 lb a.e./acre (see risk assessment for Clopyralid, pages xv, xviii – SERA 2004c). All typical exposure Hazard Quotients for terrestrial animals are less than 1.0 for clopyralid, therefore application of this chemical is not likely to affect these species.

Sethoxydim

None of the hazard quotients for mammals or birds approach a level of concern, even at the upper limits of exposure (see risk assessment for sethoxydim, page xv - SERA 2001). All typical exposure Hazard Quotients for terrestrial animals are less than 1.0 for sethoxydim, therefore application of this chemical is not likely to affect these species.

Based on these analyses and given the proposed application rate and methods, along with the prescribed mitigation measures, there will be no adverse effects on terrestrial animals (including the MIS species listed above, other wildlife species, or domestic animals such as cattle) from the application of these herbicides.

Cumulative Effects
The overall long term effects of the proposed action will benefit these MIS species. The proposed action will treat populations of NNIS, reducing their spread and the impact they have on the landscape. Although the proposed action will not eliminate NNIS in forest habitats on the Districts, it will promote the restoration of native species in areas that are currently displaced by NNIS. Long term restoration of native species and preservation of critical wildlife habitats would maintain or improve habitat conditions for these MIS.

3.4 Social and Economic Effects

3.4.1 Scenery and Recreation Resources

Current Situation

Information on the general affected environment for scenery and recreation resources can be found in the Forest Plan FEIS, pages 3-437 to 3-443 and 3-489 to 3-508.

Effects of Alternative 1 (No Action)

Direct and Indirect Effects

The no-action alternative would result in a continuation of existing conditions within the analysis area. There would be no control of NNIS, which would continue to spread. There would be no disruption to the recreating public due to the potential need to close developed or dispersed sites for herbicide application.

Direct effects to the scenery resources could potentially result from the spread of NNIS because they are a departure from the integrity and historic character of the natural landscape valued by constituents for its aesthetic appeal.

Cumulative Effects

There are no known cumulative effects under this alternative.

Effects of Alternative 2 (Proposed Action)

Direct and Indirect Effects

Visual impacts from dead and dying vegetation along trails, roads, and within and adjacent to developed recreation sites are the likely impacts from implementing the proposed action. These effects are short-term since the target vegetation would quickly deteriorate and be unnoticeable within a year after an application is made. Long-term visual effects of herbicide application would be positive since NNIS plants that have displaced native vegetation would decrease or be eliminated. Plant diversity would

increase once this vegetation is eliminated and other native vegetation reoccupies the available growing space.

There could be disruption to recreational activities while applications of herbicide are made or areas are closed for a time following treatments. Areas would be closed temporarily to minimize public contact with herbicide immediately following an application. These effects are minor due to the nature of the proposal which targets specific species of plants and usually impacts small areas. Signing required by Forest Plan standards would inform the public of treatments in specific areas to reduce impacts and to avoid contact with recently treated areas.

Cumulative Effects

There are no known cumulative effects under this alternative.

3.4.2 Economic Effects

This analysis focuses on costs of implementing this project on the approximate acreage described in Chapter 2. The analysis in Table 12 includes only variable costs associated with the treatments on an annual basis. Fixed costs such as general administration and program management are not included. Costs are based on past contract rates, herbicide contract prices, and professional estimates.

Table 12. Economic Analysis

NNIS Treatment	Approximate Cost/Acre	Treatment
Alternative 1 (no action)	$0	
Alternative 2 (proposed action)		
Manual	$ 1500	Hand pulling, digging
Mechanical	$ 200	Plowing, mowing
Cultural	$ 200	Weed torch, weed cloths
Chemical	$ 350	Foliar application, basal/bark application

3.5 Irreversible and Irretrievable Commitment of Resources

An irreversible commitment of resources refers to resources that are renewable only after a long period of time (such as soil productivity) or are non-renewable resources (such as heritage resources and minerals). There would be no irreversible commitment of resources under the Proposed Action in this analysis.

An irretrievable commitment of resources refers to losses of productivity or the use of renewable resources. This represents opportunities foregone for the period of time that

the resource cannot be used. Irretrievable commitments are discussed throughout the effects section, and some of these commitments include:

- The loss of growth of native vegetation under Alternative 1 (no-action) where the NNIS continue to consume growing space.

3.6 Civil Rights

None of the alternatives would have an effect on the civil rights of any individual. Women, Native Americans and other minority groups would not be impacted by any of the alternatives any differently than any other public groups.

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, requires Federal agencies to identify and address any disproportionate adverse human health or environmental effects of its projects on minority or low-income populations. None of the treatments would cause disproportionate, adverse impacts regarding environmental justice or protection of children.

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6.0 APPENDICES

Appendix 1. Issue Worksheet

Issues are used to formulate alternatives, prescribe mitigation measures, and to define the scope of the environmental analysis. Each response from scoping was reviewed in order to identify issues. Issues that would drive the development of an alternative are referred to as a significant issue. No significant issues were identified for this project. The results of this process are displayed in Table 1: Issue Sorting Table.

The comments/potential issues were sorted into seven categories according to whether they are:

1. Beyond the scope of the project
2. Resolved by the Forest Plan or other laws and regulations
3. Addressed through Forest Plan standards and guidelines, or Best Management Practices (BMPs)
4. Addressed through mitigation measures or design features common to all alternatives
5. Addressed by disclosing environmental consequences
6. Addressed by developing alternatives to the proposed action (significant issue)
7. To be noted with no issue identified.

Table 1: Issue Sorting Table

Issue Description	Issue Category	Additional Comments
The Forest Service should monitor NNIS plants and weeds (Allan Crawford).	4	The Forest Service does monitor these species and their spread as needed. A monitoring plan will be included with the EA.
What it the Forest Service doing about Hemlock Woolly Adelgid in Helton Creek (Howard Bush 5/9/08)?	1	The hemlock woolly adelgid is a non-native invasive insect species. This project focuses on NNIS plant species. A separate EA for the control of HWA has been completed.
Adequate measures are needed to monitor the effectiveness of control measures and protect native species (Zasha Mickey, Sierra Club 5/28/08).	4, 5	A monitoring plan will be included with the EA. In addition, the impacts of herbicide use on native species will be disclosed in the EA.
Herbicides will have negative effects on non-target species such as deer, turkeys, and cattle (Smokey Jones 5/8/08).	5	The impacts of herbicides will be disclosed in the EA.
Support for the project (Roger Tippins 5/5/08).	7	
Support for the project (Shepherd Howell 6/4/08).	7	
Support for the project (Ken Riddleberger, Georgia DNR, 5/12/08).	7	
Undue focus is put on Designated Wilderness Areas, instead the priority should be on national forest lands within the Wildlife Management Area (WMA) system (Adam	4	The priority listing of areas is designed to ensure that the NNIS populations that pose the greatest threat biodiversity and native plant populations are treated first, whether they are in a WMA or in

Issue Description	Issue Category	Additional Comments
Hammond, Georgia DNR, 6/4/08).		the Wilderness Area. It is important to note that this project will also allow Georgia DNR to treat in wildlife openings.
The timeframe for this project should be 15 or more years not the lifetime of the LMP (Adam Hammond, Georgia DNR, 6/4/08).	1	The timeline for this project will be as long as the environmental analysis is relevant and consistent with the Forest Plan
The maximum annual treatment acreages are arbitrary and seem counterproductive to the objective of controlling NNIS (Adam Hammond, Georgia DNR, 6/4/08).	4	An estimate of the number of acres to be treated annually is needed to perform the analysis required for this project.
The implementation checklist seems burdensome and not cost-effective (Adam Hammond, Georgia DNR, 6/4/08).	4	The implementation checklist is to ensure that potential environmental impacts are within the scope of the impacts predicted in the EA.
The NNIS control should be Forest-wide (Adam Hammond, Georgia DNR, 6/4/08).	1	This proposal is specific to the Blue Ridge and Conasauga Ranger Districts and is considered an administrative decision outside of the EA process. Similar NNIS control efforts are occurring on other Ranger Districts on the Forest
Instead of a spot treatment approach, this should be done on a landscape scale with identification of initial infestation points and routes of spread (Wayne Jenkins, Georgia ForestWatch 6/6/08).	4	The intention of this project is to treat NNIS populations that pose a threat to biodiversity and native plant populations across both districts. To do this we must eliminate individual populations and that will require a variety of treatments in many areas.
We would like to see a detailed monitoring plan (Wayne Jenkins, Georgia ForestWatch 6/6/08).	4	A monitoring plan will be included with the EA.
Common burdock should be added to the list (Wayne Jenkins, Georgia ForestWatch 6/6/08).	4	Common burdock, *arctium minus*, has been added to the list. It is important to note that this list is dynamic and can be changed whenever necessary.
Inventoried roadless areas should be added to the list (Wayne Jenkins, Georgia ForestWatch 6/6/08).	2	The areas that would be treated are described in terms of their management prescription as described in the Forest Plan. There is not currently a land management prescription for inventoried roadless areas, but they do fall into the category "... in areas across the Districts that do not have the features described above" and will not be left out of treatment.
All wildlife openings should be high priority areas (Wayne Jenkins, Georgia ForestWatch 6/6/08).	4	A method for assigning priorities for treatment has been included in the EA. Wildlife openings are identified as priority areas for treatment
All foot trails should be high priority areas (Wayne Jenkins, Georgia ForestWatch 6/6/08).	4	A method for assigning priorities for treatment has been included in the EA. Trails are identified as priority areas for treatment
We would like to see a ranking of NNIS by ease or difficulty of eradication (Wayne Jenkins, Georgia ForestWatch 6/6/08).	4	A method for assigning priorities for treatment has been included in the EA.
We would like to know the method of control (manual, mechanical, or chemical) that will be used (Wayne Jenkins, Georgia ForestWatch 6/6/08).	4	Treatment selection will vary by site and there is no way of knowing what treatment will be used until sites are located and visited.
Caution should be used when chemicals are being utilized (Wayne Jenkins, Georgia	7	

Issue Description	Issue Category	Additional Comments
ForestWatch 6/6/08).		
If planting is done to stabilize areas for soil erosion, we prefer the use of native species if available and the careful use of non-native non-invasive species when native seed is not available (Wayne Jenkins, Georgia ForestWatch 6/6/08).	2	The project would follow Forest Plan standard FW-056 which states that that "only native or non-persistent nonnative species" will be used to seed for soil revegetation.
The maximum treatment acres seem arbitrary and we wonder how they were derived, furthermore we would like to encourage the districts to do all they can to control NNIS and not be limited by a maximum acres (Wayne Jenkins, Georgia ForestWatch 6/6/08).	4,5	An estimate of the number of acres to be treated annually is needed to perform the Environmental Analyses required for this project.
It is important to clean trucks and equipment (i.e. graders, skidders, etc.) when entering and leaving National Forest land (Wayne Jenkins, Georgia ForestWatch 6/6/08).	7	This project focuses on treatment of NNIS through manual, cultural, and chemical means and does not address the spread through the use of equipment on the Districts.

Appendix 2. Implementation Checklist for the Treatment of NNIS Species

NRIS Site ID: _____ Species name: _____

Lat/Long in decimal degrees: N_____ W -_____

GIS Acres: _____ (*calculated from GIS*) % of Site Infested: _____

List other NNIS species present at site:

Treatment method (List methods, chemicals used, date to be treated, by whom, etc)

Designated Wilderness or Recommended Wilderness Study Area? (Y/N)

> *If yes, coordinate with District Wilderness Manager. This will require analyzing the proposed control method through the Wilderness Minimum Requirement Decision Guide (MRDG) and documenting in the project file. Final approval will be by the Forest Supervisor or Regional Forester, depending on control method chosen*

Botanist Review: (Describe any special circumstances including the presence of TES species and rare or unique communities. List all recommended mitigations below.)

Wildlife Biologist Review: (Describe any special circumstances including potential impacts to forage and wildlife investments. List all recommended mitigations below.)

Aquatic Biologist Review (only required when treating sites within riparian area):
(Describe any special circumstances including the presence of aquatic TES species. List all recommended mitigations below.)

Hydrologist/Soils Review: (Describe any special circumstances regarding potential impacts to water quality. List all recommended mitigations below.)

Archaeologist Review (only required if treatment involves ground disturbance):
(Describe any special circumstances regarding historical or cultural significance. List all recommended mitigations below.)

Signatures:

Botanist/Ecologist	Wildlife Biologist	Aquatic Biologist
Hydrologist	Archaeologist	Wilderness Mgr.(if appropriate)

Appendix 3. Monitoring Plan for Proposed Action and Alternatives

There are 3 types of monitoring; implementation, effectiveness, and validation. Implementation and effectiveness monitoring are usually applicable at the project level. The following monitoring is proposed to be conducted under the Proposed Action and Alternatives, as applicable:

Implementation monitoring:

1. *What:* Ensure compliance with FP standard FW-012 that herbicides will be applied at the lowest effective rate to meet project objectives.

How: Observation and oversight of pesticide mixing.

When: At the time herbicides are being mixed

Responsible: Contract administrator or certified pesticide applicator

2. *What:* Ensure compliance with FP standards FW-021 through FW-025 which address application of herbicide in the vicinity of waterways.

How: Observation and oversight of herbicide applications

When: At the time the herbicide is applied

Responsible: Contract administrator or certified pesticide applicator

3. *What*: Ensure BMP's are implemented for ground disturbance, prescribed burning activities and herbicide application, as appropriate.

How: Observations/inspections during activities

When: During and after implementation of activity

Responsible: Contract administrator, Forest Hydrologist, Forest Soil Scientist, District Fire Management Officer

Effectiveness monitoring:

4. *What*: Ensure target vegetation was controlled/eradicated as a result of the treatment of choice. Ensure only the target vegetation was affected

How: Observation of target and surrounding vegetation (document in contract/project folder)

When: Next growing season post treatment

Responsible: Forest or District Botanist or Wildlife Biologist, or other FS personnel qualified to identify NNIS

5. *What:*. Ensure water control structures (silt fencing, hay bales, road dips, surge stone, etc.) are present where ground disturbance is planned.

How: Observation of sites where water control structures are required.

When: Prior to ground disturbance taking place

Responsible: Contract administrator, Forest Hydrologist, Forest Soil Scientist

6. *What*: Ensure revegetation and/or mulch cover 85% of any ground-disturbance (FW-068). Take prompt measures to correct the situation if this level of cover is not present.

How: Observation of sites

When: Within 30 days of the activity

Responsible: Contract administrator, Forest Hydrologist, Forest Soil Scientist